NSQF QUALIFICATION FILE
Approved in 27th NSQC Meeting & Dated 28th Feb 2023

Qualification Code
QG-5.5-AU-00227-2023-V1-ASDC

CONTACT DETAILS OF THE BODY SUBMITTING THE QUALIFICATION FILE

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Automotive Skills Development Council

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List of documents submitted in support of the Qualifications File

1. Qualification Pack: ASC/Q8315 (Automotive Battery Management System (BMS) Engineer)
2. Documents related to QP Development (Refer to folder “Common Files”)
   (i) RFP for QP Development
   (ii) Supporting Document from GC meetings
   (iii) Labour Market Survey
   (iv) About the sector
   (v) Occupational Map
   (vi) List of Companies participating in QP Development Process
   (vii) QRC Summary Sheet
   (viii) Model Curriculum

1	**Qualification Title –** Automotive Battery Management System (BMS) Engineer	
2	**Qualification Code, if any -** ASC/Q8315	
3	**NCO code and occupation -** NCO-2015/8212.0100, 2015/8212.0200	
4	**Nature and purpose of the qualification (Please specify whether qualification is short term or long term) -** This is a Qualification Pack (QP), corresponding to Level – 6 and includes Six (6) NOSs. Targeted learners: The role entails designing of BMS of an EV. Main purpose of the qualification – is to get unemployed people into work and also to up-skilling of Skilled Engineers already in employment and to enable them to take up this role. This is a short-term qualification.	
5	**Body/bodies which will award the qualification**	ASDC
6	**Body which will accredit providers to offer courses leading to the qualification**	ASDC (recommended)
7	**Whether accreditation/affiliation norms are already in place or not , if applicable (if yes, attach a copy)**	ASDC Norms
8	**Occupation(s) to which the qualification gives access**	Automotive Product Development
9	**Job description of the occupation**	Individual at this job should benchmark, understand, release design and architecture of BMS system & its components for Electric Vehicle (EV) as per the specified norms and standards. BMS engineer also supports manager and core team during implementation and field issue resolution after implementation.
10	**Licensing requirements**	NA
11	**Statutory and Regulatory requirement of the relevant sector (documentary evidence to be provided)**	NA
12	**Level of the qualification in the NSQF**	Level 5.5
13	**Anticipated volume of training/learning required to complete the qualification**	630 Hrs
14	**Indicative list of training tools required to deliver this qualification**	Please refer annexure
15	**Entry requirements and/or recommendations and minimum age**	3 years Diploma (Mechanical/Automobile/ Electrical / Electronics) after class 10th from recognized regulatory body with 3 years of relevant experience

		OR Pursuing 4th year of B.E./B.Tech in the relevant field and continuous education OR Certificate-NSQF (Electric Vehicle Product Design Engineer/ Automotive Prototype Manufacturing Lead Technician Level 5) with 2 Years of relevant experience Age: 22 Years
16	**Progression from the qualification (Please show Professional and academic progression)**	Automotive Product Design Head Level 6.5
17	**Arrangements for the Recognition of Prior learning (RPL)**	NA
18	**International comparability (where known (research evidence to be provided)**	NA
19	**Date of planned review of qualification**	28th February 2026
20	**Formal structure of the qualification** **Mandatory components**	

	Title of component and identification code/NOSs/Learning outcomes	**Estimated size (learning hours)**	**Level**
(i)	Introduction to the role of an Automotive Battery Management System (BMS) Engineer	5	5.5
(ii)	ASC/N9818: Manage work and resources (Research & Development)	55	5.5
(iii	DGT/VSQ/N0103 -Employability Skills (90 hours)	90	5.5
(iv	ASC/N8335: Review the targeted design architecture of EV	90	5.5
(v)	ASC/N8336: Develop prominent options of BMS architecture, infrastructure and solutions	90	5.5
(vi	ASC/N8337: Conduct simulation for verification & validate of various architectures	150	5.5
(vi	ASC/N8338: Support manager to execute implementation of BMS system	150	5.5
	Sub Total (A)	**630 Hrs**	**5.5**
	Optional components		
	Title of component and identification code/NOSs/ Learning outcomes	**Estimated size (learning hours)**	**Level**

	No optional components		
	Sub Total (B)		
Total (A+B)		**630 Hrs**	**5.5**

SECTION 1
ASSESSMENT

21	**Body/Bodies which will carry out assessment:** 1. Ace Assessment Pvt. Ltd. 2. Prima Competencies Pvt. Ltd. 3. Trendsetters Skill Assessors Pvt. Ltd 4. Green Arrows Safety Management (P) Ltd. 5. Eduvantage 6. VR Skill & HR Solutions 7. SPIWD 8. Knowlarity Solutions Pvt. Ltd. 9. KAMT India 10. TCS 11. India Skills Pvt. Ltd. 12. TATA Motors
22	**How will RPL assessment be managed and who will carry it out?** The assessment body or employer assessors shall be responsible for RPL assessment. In RPL, the candidate has acquired the skills and knowledge while working and requires assessment and certification only. RPL is the acknowledgement of skills and knowledge obtained through: • formal training • work experience • life experiences The focus of RPL is the competence gained from these experiences; not how, when or where the learning occurred. **Process or steps in RPL assessments** 1. Offering RPL to potential candidates 2. Providing information to the candidate 3. Evidence collation 4. Pre-screening & orientation 5. Self-assessment 6. Assessment and making the decision 7. Feedback to the candidate 8. Documentation of outcomes 9. certification

23	**Describe the overall assessment strategy and specific arrangements which have been put in place to ensure that assessment is always valid, reliable and fair and show that these are in line with the requirements of the NSQF.**

Quality Assurance - Assessment & Certification

ASDC Certificate is Auto industry's own certificate and the certificate is expected to carry an assurance of quality. Therefore, the certified candidate should be able to demonstrate all round skills as expected by industry standard i.e. ASDC NOS/QP.
In order to achieve this objective ASDC needed to have an approach that is process driven whereby the outcomes meet the quality objectives and also display consistency.
Certification is the outcome of Assessment Process. The Process in turn is derived from an overall strategy.

ASDC Assessment Strategy

ASDC Assessment Strategy has two components:

1. Broad Guidelines provided by NSDC QRC (*Qualifications Registration Committee*)
2. ASDC's own *sector specific* overarching strategy, covering all job roles.
   - Any specific assessment approach relating to a particular job role.

1 Broad Guidelines provided by NSDC QRC (*Qualifications Registration Committee*):

a. Assessment to be conducted by SSC as per competency output defined in the NOS/QP and the assessment criteria provided in the NOS/QP
b. Assessment to be carried out by a third party Assessment Body duly affiliated to the SSC.
c. Practical and face to face Viva evaluations, where applicable, to be carried out only by the SSC approved assessor deployed by the Assessing Body deputed by SSC for the given assessment.
d. Cut off marks for certification could be in the vicinity of 70% level but individual SSC to refine &modify this criteria to suit the sectorial needs.
e. Assessing Body to declare results with due concurrence of the SSC.

2 ASDC's own sector specific strategy covering all job roles :

2.1 ASDC assessments will be comprehensive and cover all aspects of acquired knowledge, practical skills and also basic ability to communicate. Accordingly, evaluation process would include:

i. Theory/Knowledge test

ii. Practical demonstration test

iii. Face to Face Viva

2.2 Theory/Knowledge assessment will be carried out on line through a link provided for each assessment that generates a random paper from a bank of questions available at the back end.

- Exception to an online test in favour of Paper Test would be subject to non-availability of requisite broad band and/or hardware.
- On line test would be conducted in the presence of an ASDC assessor till web enabled proctoring is deployed.

2.3 ASDC assessor would be conducting Practical and Viva as per the criteria provided in the NOS/QP.

2.4 ASDC assessor would be carrying out Practical assessment for job roles such as in sales by way of role playing method.

2.5 ASDC cut offs for accepting a candidate for certification:
Automotive industry has already attained a level of globalization and is on the way to becoming even more integrated into the global supply chains with a big focus by OEMs on sourcing from India. This translates to expectation of high quality skills. In fact, the global integration process would start putting demands on skill quality standards to be in line with transnational standards.

2.6 Also there is an ever increasing quality demands placed by domestic customers.

2.7 Further, the structuring of our industry is such that the different organizations spread across the OEM, Tier1,2 manufacturing spectrum are expected to follow common quality standards. Similarly, OEMs and their Dealerships and Service Workshops also require to follow common quality standards. This implies that employees need to follow technical discipline, team work and quality processes.

2.8 ASDC aims to build a quality brand for its certification that clearly meets our industry's expectations.

2.9 The other important consideration is the Level notification by NSQF (National Skills Qualifications Framework) which provides a structure of skills ladder to be followed in the country. This ladder describes the entire skills space to be covered in 10 levels from Level 1 (for mostly menial jobs) and upto Level 10(for mostly strategy level jobs)

2.10 Keeping above points in mind ASDC evolved an acceptance criterion as follows:

- Broadly, overall cut offs to be :

	Level 1 60% Level 2 65% Level 3 70% Level 4-10 75% - Specific Theory/Practical/Viva cut offs to be as per detailed matrix for each QP. 2.11 In line with international practice there is a provision for moderation of marks to account for borderline cases. This process also covers differential moderation possibility across Theory/ Practical/ Viva. 2.12 Moderation could also be necessitated owing to variation between assessors and strictness in marking. This moderation to be carried out by concerned Assessing Body in consultation with ASDC. 2.13 In addition to recording markings of the candidate evaluation, the Assessor will also be recording general observations for every batch as per ASDC format. This record will be useful in carrying out (2.11-2.12) above. - Any specific assessment approach relating to a particular job role: o ASDC could consider *only* online test for some job roles such as in Design Engineering /Quality - ASDC assessment process would also provision a suitable re-evaluation mechanism which would offer a fair chance to the TP/candidates for Obtaining an accurate outcome. - ASDC assessment process would also provision re assessment of a batch in case the TP has enough reason to opt for this on payment of the due assessment fee. **<u>Assessment Process</u>** - ASDC Training Partner will intimate ASDC for readiness of a batch for assessment preferably 15 days before the intended assessment. - Within 3 working days ASDC will finalize an Assessing Partner for carrying out the assessment - Assessing Partner will deploy one or more ASDC approved assessor For carrying out the assessment. - Theory/Knowledge test of the approximate duration of 30-60 minutes will be conducted online for which the online link will be generated by the ASDC Technology Partner and shared with Assessment Partner. - Online test will be conducted in the presence of ASDC assessor (*ASDC is encouraging development of technology enabled proctoring and when this is ready, the online test could be conducted without requiring human proctoring*).

- Exception to an online test in favour of Paper Test would be subject to non-availability of requisite broad band and/or hardware device. Moreover, this could be allowed only after ascertain genuinely of request.
- ASDC assessor would be conducting Practical and Viva as per the criteria provided in the NOS/QP.
- ASDC Assessment Partner will ensure that the assessor to be deployed has complete understanding of the ASDC Assessment Process and the QP/NOS relevant to the assessment.
- Assessor would be reaching the venue well in time and review and on the ground verify the batch information already provided by TP.
- Assessor will then proceed to conduct the assessment as per ASDC Format starting with the attendance.
- Assessor would be capturing Viva and Practical marks on a device that has ASDC assessment link. Technology systems deployed in ASDC assessment process have provision for instantly capturing assessor evaluations in only the standard NOS/QP aligned format.
- In addition to recording markings of the evaluation, the Assessor will also be recording general observations for every batch as per ASDC format as appended below. This record will be useful in carrying out result review process.

Result Processing

- ASDC Assessment Partner responsible for Technology Platform will convert the assessment data captured by Assessor on the device into result matrix and share the same with ASDC
- ASDC Assessment cell will view the results for compliance to process and / or need for moderation in consultation with the Assessing Partner to arrive at final result for the batch as per ASDC acceptance Criteria.
- Assessing Partner will publish finalized results on data base for viewing of the Training Partner
- ASDC would issue a certificate after due verifications of candidate authenticity by way of a unique identification number such as Aadhaar.
- Certificates will be shared preferably in digital form with Training Partners
- Training Partners would be authorized to distribute certificate to candidates after printing them on a standard sheet as per ASDC template.

Re-evaluation of batch result

- Results once published will be treated as final. However, as per ASDC Assessment Strategy, there is need for provisioning a re-evaluation of results if desired by a TP essentially to cover a case where the TPs internal assessments are at large variance with the results.
- Re-evaluation will be done batch wise.
- ASDC Assessment cell will carry out re-evaluation in two steps:
  - Check for totalling error, if any
  - Use statistical tools where required to establish a pattern and extent of borderline cases.
  - Refer to the Assessor feedback form for the given batch
  - Use a weightage reference table to establish priority of type of assessment e.g. Theory or Practical or Viva
  - Where required, share the findings with Assessment Partner for review and concurrence.
  - Establish a modified range of acceptance based on above
  - In case of need for moderation based on assessor level variation, to consult the Assessing Partner/Assessor and facilitate moderated values.
  - Re do the results based on above process
  - Share the revised results with TP

Quality Assurance & Audit

While the Assessment Process based on a well-defined strategy as above, does have to build a quality assurance system, ASDC also has a plan that augments assurance.
This entails a Quality Audit process as defined below:

Tier 1 Audit

1. ASDC Assessor will be required to submit a report for each assessment carried out. This report will be as per ASDC format as described in the Assessment Process. The format of the report aims to capture details of the Training Delivery process, soft & hard infrastructure, Training of Trainer, industry connect and overall approach to training delivery vis a vis expectations of ASDC QP/NOS.
2. Each Assessment Partner is required to carry out and submit Tier 1 audit reports as per a plan and frequency agreed with ASDC.
3. ASDC will continuously review the Tier 1 audit reports for any alarming observation or trend.
4. ASDC will develop and execute a suitable action plan to redress the situation as deemed necessary for a given case.

Tier 2 Audit

1. ASDC to carry out a Tier 2 level Audit as per a plan being developed.
   a. Tier 2 audit will be carried out by a third party contracted by ASDC for the purpose.

	b. Tier 2 audit will provide adequate coverage for variables such as Assessing Partner, Assessor, TP and geographical variations. 2 ASDC Assessment cell to review audit findings at least once every month or on SOS basis. 3 Based on review findings as in 2 above, ASDC to decide on a suitable corrective action plan and execute the same. ASDC to record directional needs for refinement of Assessment process specially for incorporation of Technology that could enhance reliability and speed of assessments.

Please attach most relevant and recent documents giving further information about assessment and/or RPL.
Give the titles and other relevant details of the document(s) here. Include page references showing where to find the relevant information.

ASSESSMENT EVIDENCE
Complete a grid for each component as listed in "Formal structure of the qualification" in the Summary.

NOTE: this grid can be replaced by any part of the qualification documentation which shows the same information – i.e. Learning Outcomes to be assessed, assessment criteria and the means of assessment.

24. Assessment evidences Title of Component:

Criteria for Assessment of Trainees

Job Role: Automotive Battery Management System (BMS) Engineer
Qualification Pack: ASC/Q8315

Sector Skill Council: Automotive

Guidelines for Assessment

1. Criteria for assessment for each Qualification Pack will be created by the Sector Skill Council. Each 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 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 this criterion.
6. To pass the Qualification Pack, every trainee should score a minimum of 70% of aggregate marks to successfully clear the assessment.
7. In case of *unsuccessful completion*, the trainee may seek reassessment on the Qualification Pack.

Compulsory NOS

ASC/N9818

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
Maintain safe and secure working environment	**20**	**13**	**-**	**8**
PC1. identify hazardous activities and the possible causes of risks or accidents in the workplace	4	2	-	2
PC2. implement safe working practices for dealing with hazards to ensure safety of self and others	3	1	-	2
PC3. conduct regular checks of the machines with support of the maintenance team to identify potential hazards	2	2	-	1
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	3	2	-	1
PC5. organise safety drills or training sessions to create awareness amongst others on the identified risks and safety practices	2	-	-	-
PC6. fill daily check sheet to report improvements done and risks identified	2	2	-	-
PC7. ensure that relevant safety boards/signs are placed on the shop floor for the safety of self and others	2	2	-	1

PC8. report any identified breaches in health, safety and security policies and procedures to the designated person	2	2	-	1
Maintain Health and Hygiene	**13**	**7**	**-**	**5**
PC9. ensure workplace, equipment, restrooms etc. are sanitized regularly	3	2	-	1
PC10. ensure team is aware about hygiene and sanitation regulations and following them on the shop floor	2	1	-	-
PC11. ensure availability of running water, hand wash and alcohol-based sanitizers at the workplace	2	2	-	1
PC12. report advanced hygiene and sanitation issues to appropriate authority	1	1	-	1
PC13. follow stress and anxiety management techniques and support employees to cope with stress, anxiety etc.	2	1	-	1
PC14. wear and dispose PPEs regularly and appropriately	3	-	-	1
Effective waste management practices	**6**	**4**	**-**	**1**
PC15. ensure recyclable, non-recyclable and hazardous wastes are segregated as per SOP	3	2	-	-
PC16. ensure proper mechanism is followed while collecting and disposing of non-recyclable, recyclable and reusable waste	3	2	-	1
Material/energy conservation practices	**11**	**6**	**-**	**6**
PC17. ensure malfunctioning (fumes/ sparks/ emission/vibration/noise) and lapse in maintenance of equipment are resolved effectively	2	2	-	1
PC18. prepare and analyze material and energy audit reports to decipher excessive consumption of material and water	3	2	-	1
PC19. identify possibilities of using renewable energy and environment friendly fuels	3	1	-	2
PC20. identify processes where material and energy/electricity utilization can be optimized	3	1	-	2
NOS Total	**50**	**30**	**-**	**20**

DGT/VSQ/N0103 - Employability Skills (90 hours)

S. No	Module Name	Assessment Marks
1.	Introduction to Employability Skills	2
2.	Constitutional values - Citizenship	2
3.	Becoming a Professional in the 21st Century	4
4.	Basic English Skills	8
5.	Career Development & Goal Setting	3
6.	Communication Skills	4
7.	Diversity & Inclusion	2
8.	Financial and Legal Literacy	4
9.	Essential Digital Skills	8
10.	Entrepreneurship	5
11.	Customer Service	3
12.	Getting ready for apprenticeship & Job	5
	Total	**50**

ASC/N8335: Review the targeted design architecture of EV

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
Assess the requirements	**20**	**20**		**10**
PC1. Evaluate the type of EV that is 2W/3W/4W for information about vehicle design architecture, its components, and operational parameters to be received from the customer/OEM for the BMS infrastructure	4	4		3
PC2. Obtain the benchmarking data of previous project and evaluate the targeted applications and market requirements for the current project	3	3		2
PC3. Check the types of BSS solution to be deployed to meet the customer requirement	3	3		1

PC4. Identify prominent E/E issues & current leakages in the architecture	4	4		1
PC5. Identify required hardware & software for BMS with estimated budgeting	3	3		1
PC6. Propose the best suitable solutions to manager for the selection	3	3		2
Assessing battery system, cell design & its Thermal Management System design	**20**	**20**		**10**
PC7. Prepare the outline for proposed battery swapping system and cell design packaging	3	3		1
PC8. Evaluate proposed battery thermal management system design considering applications and vehicle architecture	4	4		2
PC9. Evaluate E component packaging space & location to check for temperature & safety	4	4		2
PC10. Review several market solutions and latest trends for the similar applications and best practices to carefully choose from available best solutions	4	4		2
PC11. Benchmark BMS in the market comparing target vehicle	3	3		2
PC12. Review SOC, SOH, Cell Chemistry & cell design, Safety measurements for similar applications	2	2		1
NOS Total	**40**	**40**	**-**	**20**

ASC/N8336: Develop prominent options of BMS architecture, infrastructure and solutions

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
Prepare hardware, software & Control system components required for BMS	**40**	**40**		**20**
PC1. Analyse & initiate concept for BMS, Hardware & Software configurations	5	5		3
PC2. Follow government norms for EV, legal requirements, safety requirements per ISO 26262 & compliances for designing BMS	5	5		2

PC3. Conduct core team interactions to define boundaries for BMS architectures	6	6		2
PC4. Prepare hardware requirement for BMS system configurations along with ECU & Sensor integration mapping)	5	5		3
PC5. Define / Develop Software architecture using MBD approach	6	6		3
PC6. Define control system algorithms using Coulomb Counting Method or Kalman Filter Method for estimating SOC, SOH, SOP, SOS, Fault Detection code & diagnostics, Battery Life Estimation, Charging & Discharging monitoring & Controlling mechanisms	7	7		4
PC7. Prepare estimated budget requirements	4	4		2
PC8. Submit the same for approval to the management	2	2		1
NOS Total	**40**	**40**	**-**	**20**

ASC/N8338: Conduct simulation for verification & validate of various architectures

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
Verify design options and plan for Design validation and planning (DVP) requirements	**32**	**24**		**16**
PC1. Complete design simulations using software like MATLAB or Simulink reflecting vehicle applications, loading conditions, Charging & Discharging Profiles, SOC estimations based on Coulomb counting or Kalman Filter algorithms etc.	7	7		5
PC2. Review simulation results for Cell Voltage, Temperature, SOC, SOH, cell balancing	5	5		3
PC3. Discuss with superior & perform design improvements for BMS architecture	5	5		2
PC4. Benchmark technical guidelines TGR/TGW for similar BMS	4	4		2
PC5. Get the design Validation Plan (DVP) considering design requirements, loading conditions, vehicle applications, usage	7	7		2

patterns, Governing legal regulations & Safety standards & requirements, ASIC C/D Compliance, EMI/EMC Requirements				
PC6. Support testing & planning team to complete testing / validations on technical topics	4	4		2
Publish technical verification / validations results and architectures options	**8**	**8**		**4**
PC7. Prepare comparison study with verification & testing results outcomes	4	4		2
PC8. Discuss & prepare most suitable BMS architecture option recommendation considering design parameters, adaption complexity, cost	4	4		2
NOS Total	**40**	**40**	**-**	**20**

ASC/N8339: Support manager to execute implementation of BMS system

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
Prepare for implementation of BMS	**19**	**19**		**9**
PC1. Obtain the approval from the management on the selected proposal	2	2		1
PC2. Prepare detailed design for H/W & Software Interfaces, UI/UX interfaces	5	5		2
PC3. Prepare control system detailed design with defined architecture & strategies	4	4		2
PC4. Release detail design, architecture Drawings for development	3	3		2
PC5. Prepare & release specification book for various components & system	3	3		2
Support manager & project teams to execute implementation of BMS	**21**	**21**		**11**
PC6. Participate in design reviews with the team internally & externally	4	4		2
PC7. Support the core team for necessary technical clarifications & resolutions from R&D network	4	4		2
PC8. Support for vehicle integration & series implementation	4	4		2

PC9. Participate quality meetings & receive BMS performance feedback	4	4		2
PC10. Understand field issues regarding BMS related to various architecture, durability or control system issues	3	3		2
PC11. Propose & provide necessary technical resolution for the issues during deployment	2	2		1
NOS Total	**40**	**40**	**-**	**20**

Means of assessment 1

The emphasis is on 'learning-by-doing' and practical demonstration of skills and knowledge based on the performance criteria.

The assessment papers for theory and practical are developed by Subject Matter Experts (SME) available with the Assessment Agency as per the performance and assessment criteria mentioned in the Qualification Packs.

Tests are administered and marks for theory paper and practical's demonstrating the selling techniques, handling of jewellery and retail sales counter. All the components and the performance criteria are covered during the test.

Means of assessment 2

The assessments for theory is carried out in Offline mode (TAB) and the practical assessments is carried out with the availability of the equipment at the TC, as predefined for the job role.

Pass/Fail

The minimum total marks to be achieved for being competent are 70% in total.

SECTION 2

25. EVIDENCE OF LEVEL

OPTION A

Title/Name of qualification/component: Automotive Battery Management System (BMS) Engineer			**Level: 5.5**
NSQF Domain	**Outcomes of the Qualification/Component**	**How the job role relates to the NSQF level descriptors**	**NSQF Level**
Process	The individual on the job needs to design and develop BMS system for an EV	The individual on the job is responsible for own work and learning in BMS system development environment.	6
Professional knowledge	The individual on the job needs to have factual knowledge of: ● BMS system architecture. ● Different types of tools used for development and implementation. ● Basic fundamentals of BMS system working. ● Prepare and design BMS system ● Implement strategies for integration and installation of BMS system.	Factual knowledge of different tools and equipment.	6
Professional skill	Recall and demonstrate practical skill to routine and repetitive applications: ● Designing of BMS system ● Implementation of BMS system. ● Recognise a workplace problem or a potential problem and take action.	Recall and demonstrate practical skill, routine and repetitive in wide range of application, using appropriate rule and tool, using quality concepts.	6
Core skill	The user individual on the job needs to have written and oral communication skills like: ● To prepare plans and designs.	Language to communicate written or oral, with required clarity, skill to basic arithmetic and algebraic principles, basic understanding of social political and natural environment.	6

	● Read and interpret designs and schedules. ● Read machine drawings/ engineering drawings, sketches.		
Responsibility	The individual on the job needs to know their own responsibility of designing a BMS system for an VE.	The individual on the job is responsible for own work and fully responsible for other's work and learning.	6

NSQF QUALIFICATION FILE

SECTION 3 EVIDENCE OF NEED

26. **What evidence is there that the qualification is needed? What is the estimated uptake of this qualification and what is the basis of this estimate?**

Need of the qualification?

ASDC carried out comprehensive skill gap study and collected feedback from industry with respect to roles for which qualification packs development are required. The occupational map was finalised accordingly. The need of this particular qualification was revalidated during the comprehensive interaction with Industry in the process of seeking their input for QP/NOS development.

Industry relevance?

Yes, NSDC QRC process has been adhered to. This includes minimum 30 validations for the QP from employers in the sector. This has been across small, medium and large companies.

ASDC undertaken validation from the industry players and also industry endorsement from 60 end user industry which are mix of 16 large (lease sized over 200 hectares) companies, 11 medium lease (more than 50 and less than 200 hectare) companies and 10 small leases (less than 50 hectare) companies.

Uses of Qualifications and industry uptake

Skill GAP analysis carried out by a reputed research agency provided a broad estimate of demand. The report can be referred in the Common Files. ASDC is taking initiative to develop a labour market information database that would peg the demand more accurately- job role wise as well as based on geographical spread. Key enabler segments for the core segments of the Automotive Industry include Auto Insurance, Financiers, Mechanics, and Auto Dealers etc.

Based on the current growth profile in the Indian auto Industry, it is expected that an additional 2~2.5 million employment opportunities per annum will be created in the Indian auto industry over the next decade. The details below provide the manpower requirement at various levels:

- Skill Level 1 – 4, people, Demand for such manpower is expected to be around 15 – 18 lakh per annum.
- Skill Level 5 -6 people working as supervisors on the shop floor. Demand for such manpower if expected to be around 4 lakh per annum.
- Skill Level 5- 7 people includes primarily engineers (B.E., M. Tech., MS), working in managerial grade, and demand for such manpower is expected to be around 1 lakh per annum.

Skill Level 6-10 people are executives, including engineers and doctorates, and demand for such manpower is expected to be around0.5 lakh per annum.

27. **Recommendation from the concerned Line Ministry of the Government/Regulatory Body**

Data to be provided by ASDC

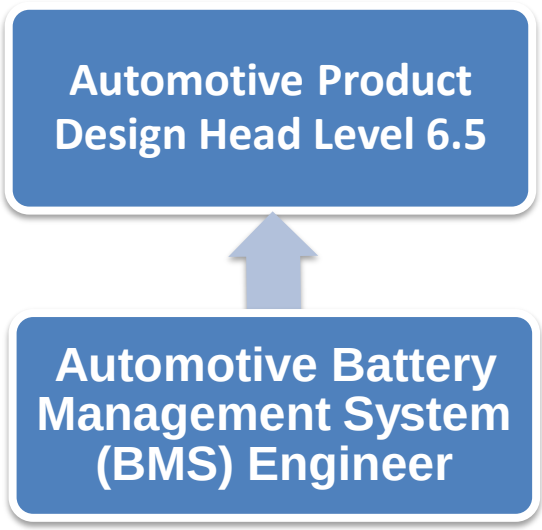
28. What steps were taken to ensure that the qualification(s) does/do not duplicate already existing or planned qualifications in the NSQF?

- NSDC list of Approved and Under-Development QPs were checked prior to commissioning the work.
- NSDC QRC team also confirmed the same.

• Qualifications Registration Committee's (QRC) diligence process ensures no duplication
29. What arrangements are in place to monitor and review the qualification(s)? What data will be used and at what point will the qualification(s) be revised or updated? • ASDC Review committee will review all QP/NOS at regular periodicity or as per NSDC guidelines. • Review will be based on – a) Revalidation of minimum requisites to perform in a Job role from pan India industry partners. b) Any change in technology and process relevant to the particular QP and Job roles.

Please attach most relevant and recent documents giving further information about any of the topics above.
Give the titles and other relevant details of the document(s) here. Include page references showing where to find the relevant information.

SECTION 4
EVIDENCE OF PROGRESSION

30	**What steps have been taken in the design of this or other qualifications to ensure that there is a clear path to other qualifications in this sector?** ***Show the career map here to reflect the clear progression*** 

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