

Qualification Pack



Maintenance Technician Electrical Level 4

QP Code: ASC/Q6803

Version: 1.0

NSQF Level: 4

Automotive Skills Development Council || 153, Gr Floor, Okhla Industrial Area, Phase - III, Leela Building
New Delhi - 110020

Qualification Pack

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ASC/Q6803: Maintenance Technician Electrical Level 4

Brief Job Description

Individuals at this job are responsible for maintaining the Electrical/ electronic systems of equipment and machinery. They use laid down procedures and knowledge of the equipment to conduct routine maintenance and organize repairs. They are also involved in control and monitoring devices and occasionally in the manufacture of items that will help in maintenance.

Personal Attributes

This job requires the individual to work independently and be judicious in making decisions pertaining to ones area of work. The individual should be result oriented & be able to demonstrate skills for information ordering, oral expression skills along with comprehension. The individual must be physically fit as to be able to maintain unusual working hours.

Applicable National Occupational Standards (NOS)

Compulsory NOS:

1. [ASC/N0002: Work effectively in a team](#)
2. [ASC/N0006: Maintain a safe and healthy working environment](#)
3. [ASC/N0021: Maintain 5S at the work premises](#)
4. [ASC/N6804: Develop understanding of the equipment](#)
5. [ASC/N6805: Carry out preventive/breakdown maintenance of the electrical/electronic systems of the equipment](#)

Qualification Pack (QP) Parameters

Sector	Automotive
Sub-Sector	Manufacturing Support
Occupation	Maintenance
Country	India
NSQF Level	4
Aligned to NCO/ISCO/ISIC Code	NCO-2015/3113.0102

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Minimum Educational Qualification & Experience	Diploma (Industrial/Production/Mechanical Engineering) with 5-10 Years of experience Maintenance/Manufacturing OR B.E./B.Tech (Industrial/Production/Mechanical Engineering) with 5-10 Years of experience Maintenance/Manufacturing
Minimum Level of Education for Training in School	
Pre-Requisite License or Training	Basic fundamentals training courses on working of equipment and machinery TPM , Predictive maintenance Techniques, Automation, Robotics
Minimum Job Entry Age	18 Years
Last Reviewed On	23/09/2013
Next Review Date	31/03/2021
Deactivation Date	31/03/2021
NSQC Approval Date	20/07/2015
Version	1.0

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

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National Occupational Standards (NOS) Parameters

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

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ASC/N0006: Maintain a safe and healthy working environment

Description

This NOS is about creating a Safe and Healthy work place, adhering to the safety guidelines in the working area, following practices which are not impacting the environment in a negative manner and training team members on health and safety related issues

Scope

The role holder will be responsible for

- identifying and reporting of risks
- creating and sustaining a safe, clean and environment friendly work place This NOS will be applicable to all Automotive sector manufacturing job roles

Elements and Performance Criteria

Identify and report the risks identified

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

- PC1..** Identify activities which can cause potential injury through sharp objects, burns, fall, electricity, gas leakages, radiation, poisonous fumes, chemicals ,loud noise
- PC2.** Inform the concerned authorities about the potential risks identified in the processes, workplace area/ layout, materials used etc
- PC3.** Inform the concerned authorities about machine breakdowns, damages which can potentially harm man/ machine during operations
- PC4.** Create awareness amongst other by sharing information on the identified risks

Create and sustain a Safe, clean and environment friendly work place

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

- PC5..** Follow the instructions given on the equipment manual describing the operating process of the equipments
- PC6..** Follow the Safety, Health and Environment related practices developed by the organization
- PC7.** Operate the machine using the recommended Personal Protective Equipments (PPE)
- PC8. .** Maintain a clean and safe working environment near the work place and ensure there is no spillage of chemicals, production waste, oil, solvents etc
- PC9.** Maintain high standards of personal hygiene at the work place
- PC10.** Ensure that the waste disposal is done in the designated area and manner as per organization SOP.
- PC11.** Inform appropriately the medical officer/ HR in case of self or an employees illness of contagious nature so that preventive actions can be planned for others

Knowledge and Understanding (KU)

The individual on the job needs to know and understand:

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- KU1.** relevant standards, procedures and policies related to Health, Safety and Environment followed in the company
- KU2.** basic knowledge of Safety procedures(fire fighting, first aid) within the organization
- KU3.** knowledge of various types of PPEs and their usage
- KU4.** basic knowledge of risks/hazards associated with each occupation in the organization
- KU5.** how to safely operate various tools and machines and risks associated with the tools/ equipment
- KU6.** knowledge of personal hygiene and how an individual can contribute towards creating a highly safe and clean working environment

Generic Skills (GS)

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

- GS1.** write basic level notes and observations
- GS2.** read safety instructions put up across the plant premises
- GS3.** read safety precautions mentioned in equipment manuals and panels to understand the potential risks associated
- GS4.** effectively communicate information to team members
- GS5.** inform employees in the plant and concerned functions about events, incidents & potential risks observed related to Safety, Health and Environment.
- GS6.** question operator/ supervisor in order to understand the safety related issues
- GS7.** attentively listen with full attention and comprehend the information given by the speaker during safety drills and training programs
- GS8.** use common sense and make judgments during day to day basis
- GS9.** use reasoning skills to identify and resolve basic problems
- GS10.** use common sense and make judgments during day to day basis
- GS11.** use reasoning skills to identify and resolve basic problems

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Assessment Criteria

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
<i>Identify and report the risks identified</i>	8	23	-	-
PC1.. Identify activities which can cause potential injury through sharp objects, burns, fall, electricity, gas leakages, radiation, poisonous fumes, chemicals ,loud noise	3	6	-	-
PC2. Inform the concerned authorities about the potential risks identified in the processes, workplace area/ layout, materials used etc	2	6	-	-
PC3. Inform the concerned authorities about machine breakdowns, damages which can potentially harm man/ machine during operations	2	6	-	-
PC4. Create awareness amongst other by sharing information on the identified risks	1	5	-	-
<i>Create and sustain a Safe, clean and environment friendly work place</i>	17	52	-	-
PC5.. Follow the instructions given on the equipment manual describing the operating process of the equipments	3	7	-	-
PC6.. Follow the Safety, Health and Environment related practices developed by the organization	3	8	-	-
PC7. Operate the machine using the recommended Personal Protective Equipments (PPE)	3	8	-	-
PC8. . Maintain a clean and safe working environment near the work place and ensure there is no spillage of chemicals, production waste, oil, solvents etc	2	8	-	-
PC9. Maintain high standards of personal hygiene at the work place	2	7	-	-
PC10. Ensure that the waste disposal is done in the designated area and manner as per organization SOP.	3	8	-	-

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Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
PC11. Inform appropriately the medical officer/ HR in case of self or an employees illness of contagious nature so that preventive actions can be planned for others	1	6	-	-
NOS Total	25	75	-	-

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National Occupational Standards (NOS) Parameters

NOS Code	ASC/N0006
NOS Name	Maintain a safe and healthy working environment
Sector	Automotive
Sub-Sector	Manufacturing
Occupation	Maintenance
NSQF Level	4
Credits	TBD
Version	1.0
Last Reviewed Date	15/09/2013
Next Review Date	15/09/2015
NSQC Clearance Date	20/07/2015

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ASC/N0021: Maintain 5S at the work premises

Description

This NOS is about ensuring all 5 S activities both at the shop floor and the office area to facilitate increase in work productivity

Scope

The individual needs to. Ensure sorting, streamlining & organizing, storage and documentation, cleaning, standardization and sustenance across the plant and office premises of the organization

Elements and Performance Criteria

Ensure sorting

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

- PC1..** follow the sorting process and check that the tools, fixtures & jigs that are lying on workstations are the ones in use and unnecessary items are not cluttering the workbenches or work surfaces.
- PC2..** ensure segregation of waste in hazardous/ non hazardous waste as per the sorting work instructions
- PC3..** follow the technique of waste disposal and waste storage in the proper bins as per sop
- PC4..** segregate the items which are labelled as red tag items for the process area and keep them in the correct places
- PC5.** sort the tools/ equipment/ fasteners/ spare parts as per specifications/ utility into proper trays, cabinets, lockers as mentioned in the 5s guidelines/ work instructions
- PC6. .** ensure that areas of material storage areas are not overflowing
- PC7.** properly stack the various types of boxes and containers as per the size/ utility to avoid any fall of items/ breakage and also enable easy sorting when required
- PC8.** return the extra material and tools to the designated sections and make sure that no additional material/ tool is lying near the work area
- PC9.** follow the floor markings/ area markings used for demarcating the various sections in the plant as per the prescribed instructions and standards
- PC10.** follow the proper labeling mechanism of instruments/ boxes/ containers and maintaining reference files/ documents with the codes and the lists

Ensure proper documentation and storage (organizing , streamlining)

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

- PC11.** check that the items in the respective areas have been identified as broken or damaged
- PC12.** follow the given instructions and check for labelling of fluids, oils. lubricants, solvents, chemicals etc. and proper storage of the same to avoid spillage, leakage, fire etc
- PC13.** make sure that all material and tools are stored in the designated places and in the manner indicated in the 5s instructions

Ensure cleaning of self and the work place

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

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- PC14.** check whether safety glasses are clean and in good condition
- PC15.** keep all outside surfaces of recycling containers are clean
- PC16..** ensure that the area has floors swept, machinery clean and generally clean. in case of cleaning, ensure that proper displays are maintained on the floor which indicate potential safety hazards
- PC17..** check whether all hoses, cabling & wires are clean, in good condition and clamped to avoid any mishap or mix up
- PC18..** ensure workbenches and work surfaces are clean and in good condition
- PC19.** follow the cleaning schedule for the lighting system to ensure proper illumination
- PC20.** store the cleaning material and equipment in the correct location and in good condition
- PC21.** ensure self-cleanliness - clean uniform, clean shoes, clean gloves, clean helmets, personal hygiene

Ensure sustenance

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

- PC22.** follow the daily cleaning standards and schedules to create a clean working environment
- PC23.** attend all training programs for employees on 5 s
- PC24.** support the team during the audit of 5 s
- PC25.** participate actively in employee work groups on 5s and encourage team members for active participation
- PC26.** follow the guidelines for what to do and what not to do to build sustainability in 5s as mentioned in the 5s check lists/ work instructions

Knowledge and Understanding (KU)

The individual on the job needs to know and understand:

- KU1.** relevant standards, procedures and policies related to 5S followed in the company
- KU2.** have basic knowledge of 5S procedures
- KU3.** know various types 5s practices followed in various areas
- KU4.** understand the 5S checklists provided in the department/ team
- KU5.** have skills to identify useful & non useful items
- KU6.** have knowledge of labels , signs & colours used as indicators
- KU7.** knowledge on how to sort and store various types of tools, equipment, material etc.
- KU8.** know , how to identify various types of waste products
- KU9.** understand the impact of waste/ dirt/ dust/unwanted substances on the process/ environment/ machinery/ human body
- KU10.** have knowledge of best ways of cleaning & waste disposal
- KU11.** understand the importance of standardization in processes
- KU12.** understand the importance of sustainability in 5S
- KU13.** have knowledge of TQM process
- KU14.** have knowledge of various materials and storage norms
- KU15.** understand visual controls, symbols, graphs etc.

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Generic Skills (GS)

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

- GS1.** write basic level notes and observations
- GS2.** note down observations (if any) related to the process
- GS3.** read 5S instructions put up across the plant premises
- GS4.** effectively communicate information to team members inform employees in the plant and concerned functions about 5S
- GS5.** question the process head in order to understand the 5S related issues
- GS6.** attentively listen with full attention and comprehend the information given by the speaker during 5S training programs
- GS7.** use common sense and make judgments during day to day basis
- GS8.** use reasoning skills to identify and resolve basic problems using 5S
- GS9.** persuade co team members to follow 5 S
- GS10.** ensure that the co team members understand the importance of using 5 S tool
- GS11.** use innovative skills to perform and manage 5 S activities at the work desk and the shop floor
- GS12.** exhibit inquisitive behaviour to seek feedback and question on the existing set patterns of work
- GS13.** do what is right, not what is a popular practices
- GS14.** follow shop floor rules& regulations and avoid deviations; make 5S an integral way of life
- GS15.** ensure self-cleanliness on a daily basis
- GS16.** demonstrate the will to keep the work area in a clean and orderly manner

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Assessment Criteria

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
<i>Ensure sorting</i>	10	30	-	-
PC1.. follow the sorting process and check that the tools, fixtures & jigs that are lying on workstations are the ones in use and unnecessary items are not cluttering the workbenches or work surfaces.	1	3	-	-
PC2.. ensure segregation of waste in hazardous/ non hazardous waste as per the sorting work instructions	1	3	-	-
PC3.. follow the technique of waste disposal and waste storage in the proper bins as per sop	1	3	-	-
PC4.. segregate the items which are labelled as red tag items for the process area and keep them in the correct places	1	3	-	-
PC5. sort the tools/ equipment/ fasteners/ spare parts as per specifications/ utility into proper trays, cabinets, lockers as mentioned in the 5s guidelines/ work instructions	1	3	-	-
PC6. . ensure that areas of material storage areas are not overflowing	1	3	-	-
PC7. properly stack the various types of boxes and containers as per the size/ utility to avoid any fall of items/ breakage and also enable easy sorting when required	1	3	-	-
PC8. return the extra material and tools to the designated sections and make sure that no additional material/ tool is lying near the work area	1	3	-	-
PC9. follow the floor markings/ area markings used for demarcating the various sections in the plant as per the prescribed instructions and standards	1	3	-	-
PC10. follow the proper labeling mechanism of instruments/ boxes/ containers and maintaining reference files/ documents with the codes and the lists	1	3	-	-

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Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
<i>Ensure proper documentation and storage (organizing , streamlining)</i>	3	9	-	-
PC11. check that the items in the respective areas have been identified as broken or damaged	1	3	-	-
PC12. follow the given instructions and check for labelling of fluids, oils, lubricants, solvents, chemicals etc. and proper storage of the same to avoid spillage, leakage, fire etc	1	3	-	-
PC13. make sure that all material and tools are stored in the designated places and in the manner indicated in the 5s instructions	1	3	-	-
<i>Ensure cleaning of self and the work place</i>	8	24	-	-
PC14. check whether safety glasses are clean and in good condition	1	3	-	-
PC15. keep all outside surfaces of recycling containers are clean	1	3	-	-
PC16.. ensure that the area has floors swept, machinery clean and generally clean. in case of cleaning, ensure that proper displays are maintained on the floor which indicate potential safety hazards	1	3	-	-
PC17.. check whether all hoses, cabling & wires are clean, in good condition and clamped to avoid any mishap or mix up	1	3	-	-
PC18.. ensure workbenches and work surfaces are clean and in good condition	1	3	-	-
PC19. follow the cleaning schedule for the lighting system to ensure proper illumination	1	3	-	-
PC20. store the cleaning material and equipment in the correct location and in good condition	1	3	-	-
PC21. ensure self-cleanliness - clean uniform, clean shoes, clean gloves, clean helmets, personal hygiene	1	3	-	-
<i>Ensure sustenance</i>	4	12	-	-

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Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
PC22. follow the daily cleaning standards and schedules to create a clean working environment	1	3	-	-
PC23. attend all training programs for employees on 5 s	0.5	2	-	-
PC24. support the team during the audit of 5 s	1	3	-	-
PC25. participate actively in employee work groups on 5s and encourage team members for active participation	0.5	2	-	-
PC26. follow the guidelines for what to do and what not to do to build sustainability in 5s as mentioned in the 5s check lists/ work instructions	1	2	-	-
NOS Total	25	75	-	-

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National Occupational Standards (NOS) Parameters

NOS Code	ASC/N0021
NOS Name	Maintain 5S at the work premises
Sector	Automotive
Sub-Sector	Generic
Occupation	Generic
NSQF Level	4
Credits	TBD
Version	1.0
Last Reviewed Date	15/03/2014
Next Review Date	15/03/2016
NSQC Clearance Date	

Qualification Pack

ASC/N6804: Develop understanding of the equipment

Description

This OS unit is about the study and analysis of the various equipment and machinery used in the production process and also ensuring safety of manpower using those equipment and machinery.

Scope

The unit/ task covers the following:

- Studying the manual , other information received for the equipment
- Understanding the manufacturing Process

Elements and Performance Criteria

Studying the Operating Manual & other information and activities related to the equipment

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

- PC1..** understand the following from the equipment manual Assembly sub systems, sequence Electrical Motors, controls, sensors, fuses, PLCs used Mechanisms & operation including controls, automation Standard parts & ones specific to the machine Wiring / control systems/ circuit diagrams Motherboard Standard recommended spares Consumables required to be used. Precautions, fault detection guidelines Frequency recommended for maintenance vis-a vis operating loads
- PC2..** lay down the system for the maintenance cycle of each equipment by sticking appropriate stickers or recording maintenance schedules for routine activities by operator/ M/c technician special periodic by the maintenance team
- PC3..** keep the special / standard tool kits ready for usage at short notice.
- PC4..** for special purpose equipment made for the organization ensure that the drawings & other information matches with the current status of the equipment.
- PC5..** learn new points and update the troubleshooting check sheets available with the manual.
- PC6..** learn while giving support to seniors/ external experts in predictive / breakdown maintenance activity.

Planning the maintenance activity

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

- PC7..** plan the time and schedule for preventive maintenance cycle based on the equipment manufacturers recommendations and the history of similar equipment handled, used in the plant.
- PC8..** plan the installation/ shifting activity in totality considering special experts/ external support and material and tools required for the civil, material handling activity , consumables, wiring, soldering connections, testing cycles and everything mentioned in the equipment manual.
- PC9..** discuss with seniors in manufacturing, maintenance for planning activity prior to the schedule to ensure all points are adequately considered.
- PC10..** plan as much as possible standardization of electrical elements such as wires, fuses, plcs etc. while new lines/ shifting activities are being planned

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PC11.. plan for support from production , other specialist teams in maintenance based on their schedules.

PC12.. plan support from outside experts for special techniques.

Understanding the manufacturing process

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

PC13.. study the process cycle while the equipment is working to completely understand the duty conditions and working principles etc.

PC14.. study the standard working , running schedule for the equipment to find slots for maintenance activities

PC15.. study the critical areas to find out possibilities of impending breakdowns, fuse blow-outs, failures, life cycles of electrical units etc.

Knowledge and Understanding (KU)

The individual on the job needs to know and understand:

KU1. company manufacturing processes & the equipment in use

KU2. existing layout for the processes

KU3. sequence of operations for each process

KU4. facility planning methodology being followed in the company

KU5. future capacity expansions plans (if any) of the company

KU6. complete knowledge of the process in consideration

KU7. Soldering connections

KU8. engineering drawings of existing layout/ equipment

KU9. operation of machinery and equipment being used for the process

KU10. manpower deployment plan for process

KU11. material and information flow of the process

KU12. Electrical / electronic standard parts vendor infrastructure

Generic Skills (GS)

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

GS1. read the information displayed at the workplace

GS2. draft a pictorial representation of the existing layout for better comprehension

GS3. compile all the data related to study of existing facility in form of presentations and reports

GS4. communicate with shop floor workers gathering inputs/requirements

GS5. Enter the information related to maintenance activities in ERP, History sheets

GS6. spell out effectively the findings of the study to the higher management in meetings

GS7. interact with workers and gather all the information related to process requirements

GS8. share operation knowledge with co-workers

GS9. coordinate with the facility planning department team and ensure timely analysis for layout designing

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- GS10.** collate data from various third parties involved (if any) in existing facility design and development
- GS11.** plan the execution of requirements study for layout design in a effective manner and on timely basis
- GS12.** analyze the way in which the existing facility layout is in operation and think of more economic and feasible measures for existing layout modification/redesigning

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Assessment Criteria

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
<i>Studying the Operating Manual & other information and activities related to the equipment</i>	10	26	-	-
PC1.. understand the following from the equipment manual Assembly sub systems, sequence Electrical Motors, controls, sensors, fuses, PLCs used Mechanisms & operation including controls, automation Standard parts & ones specific to the machine Wiring / control systems/ circuit diagrams Motherboard Standard recommended spares Consumables required to be used. Precautions, fault detection guidelines Frequency recommended for maintenance vis-a vis operating loads	3	4	-	-
PC2.. lay down the system for the maintenance cycle of each equipment by sticking appropriate stickers or recording maintenance schedules for routine activities by operator/ M/c technician special periodic by the maintenance team	3	6	-	-
PC3.. keep the special / standard tool kits ready for usage at short notice.	1	4	-	-
PC4.. for special purpose equipment made for the organization ensure that the drawings & other information matches with the current status of the equipment.	1	4	-	-
PC5.. learn new points and update the troubleshooting check sheets available with the manual.	1	4	-	-
PC6.. learn while giving support to seniors/ external experts in predictive / breakdown maintenance activity.	1	4	-	-
<i>Planning the maintenance activity</i>	14	29	-	-
PC7.. plan the time and schedule for preventive maintenance cycle based on the equipment manufacturers recommendations and the history of similar equipment handled, used in the plant.	3	5	-	-

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Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
PC8.. plan the installation/ shifting activity in totality considering special experts/ external support and material and tools required for the civil, material handling activity , consumables, wiring, soldering connections, testing cycles and everything mentioned in the equipment manual.	3	5	-	-
PC9.. discuss with seniors in manufacturing, maintenance for planning activity prior to the schedule to ensure all points are adequately considered.	2	4	-	-
PC10.. plan as much as possible standardization of electrical elements such as wires, fuses, plcs etc. while new lines/ shifting activities are being planned	2	5	-	-
PC11.. plan for support from production , other specialist teams in maintenance based on their schedules.	2	5	-	-
PC12.. plan support from outside experts for special techniques.	2	5	-	-
<i>Understanding the manufacturing process</i>	6	15	-	-
PC13.. study the process cycle while the equipment is working to completely understand the duty conditions and working principles etc.	2	5	-	-
PC14.. study the standard working , running schedule for the equipment to find slots for maintenance activities	2	5	-	-
PC15.. study the critical areas to find out possibilities of impending breakdowns, fuse blow-outs, failures, life cycles of electrical units etc.	2	5	-	-
NOS Total	30	70	-	-

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National Occupational Standards (NOS) Parameters

NOS Code	ASC/N6804
NOS Name	Develop understanding of the equipment
Sector	Automotive
Sub-Sector	Manufacturing and R&D
Occupation	Maintenance
NSQF Level	4
Credits	TBD
Version	1.0
Last Reviewed Date	23/09/2013
Next Review Date	30/09/2015
NSQC Clearance Date	

Qualification Pack

ASC/N6805: Carry out preventive/breakdown maintenance of the electrical/electronic systems of the equipment

Description

This OS unit is about the carrying out the preventive / breakdown maintenance of the electrical systems of the equipment in the plant .

Scope

The unit/ task covers the following:

- Preparing for the maintenance activity
- Carrying out the maintenance for the equipment
- Taking trials and handing over the equipment to the user

Elements and Performance Criteria

Preparing for the maintenance activity

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

- PC1..** understand the following from the maintenance schedules Calendar for the equipment scheduled for preventive maintenance Standard and special tool kits required for carrying out the task Consumables, replacement spare parts required
- PC2..** verify routine check list activities have been conducted by the user-operator
- PC3..** be part of the team planning new equipment, installations, layout planning etc. so that the maintenance aspect is planned appropriately in the specifications and norms.

Carrying out the maintenance activity

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

- PC4 ..** open the equipment and replace the scheduled spare parts as per the schedule
- PC5..** check / confirm internal conditions of wiring , motherboards etc. to verify working status to expected conditions. discuss with the user/ operator to learn about problems /unusual phenomenon noticed on the equipment.
- PC6..** assemble back, covers , guards, clamps, insulation etc. & prepare for taking the trials.
- PC6..** change the maintenance due / status sticker on the equipment.
- PC7..** to attend the breakdown maintenance verify in appropriate sequence for the equipment Charge leakage/ short circuit from parts Breakage of wires, clamps Unusual contacts of electrical wires with moving parts Erratic / problematic performance Any problem condition as reported in the complaint
- PC8..** plan sequence of activities for changing, correcting the situation after opening, verifying contact/ insulation conditions, failure of internal wires etc. and ensure the circuit elements, consumables are available at the work place.
- PC9..** use appropriate PPE, material handling equipment and tools and carry out the task . Use recommended methods, consumables, tools for Electrical / electronic connections Verification of continuity joints, including soldered

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- PC10..** take support from experts, user , team members from maintenance during the activity if required.
- PC11..** clock the time for the task so that the scheduling and planning can be improved in future.
- PC12..** when carrying out the installation/ shifting activity record the time and unplanned tasks encountered in the activity.
- PC13..** discuss with seniors in manufacturing, maintenance for improving the activity to ensure all points are adequately considered.

Taking the trials & hand over the equipment for manufacturing process

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

- PC14..** take trials of running step by step increasing duty conditions gradually and verify specified parameters are attained and no abnormalities achieved,
- PC15..** study the standard working , running for a few cycles of the equipment to ascertain normal working in presence of the user .
- PC16..** handover the equipment to the user.

Documentation & Records

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

- PC17..** update the history sheet with the replacement details .
- PC 18 ..** discuss with seniors and decide if any change is necessary for preventive schedules based on the breakdown activity.

Knowledge and Understanding (KU)

The individual on the job needs to know and understand:

- KU1.** company manufacturing processes & the equipment in use
- KU2.** existing layout for the processes
- KU3.** sequence of operations for each process
- KU4.** facility planning methodology being followed in the company
- KU5.** future capacity expansions plans (if any) of the company
- KU6.** complete knowledge of the process in consideration
- KU7.** dimensions and type of the existing facility being used for the process
- KU8.** Electrical -wiring drawings of existing layout/ equipment
- KU9.** operation of electrical equipment viz motors etc . being used for the process
- KU10.** PLC , SCADA , & electrical elements operation ,testing ,
- KU11.** material and information flow of the process

Generic Skills (GS)

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

- GS1.** read the information displayed at the workplace
- GS2.** draft a pictorial representation of the existing layout for better comprehension
- GS3.** compile all the data related to study of existing facility in form of presentations and reports

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- GS4.** communicate with shop floor workers gathering inputs/requirements
- GS5.** Enter the information related to maintenance activities in ERP, History sheets
- GS6.** spell out effectively the findings of the study to the higher management in meetings
- GS7.** interact with workers and gather all the information related to process requirements
- GS8.** share operation knowledge with co-workers
- GS9.** coordinate with the facility planning department team and ensure timely analysis for layout designing
- GS10.** collate data from various third parties involved (if any) in existing facility design and development
- GS11.** plan the execution of requirements study for layout design in a effective manner and on timely basis
- GS12.** analyze the way in which the existing facility layout is in operation and think of more economic and feasible measures for existing layout modification/redesigning

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Assessment Criteria

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
<i>Preparing for the maintenance activity</i>	4	12	-	-
PC1.. understand the following from the maintenance schedules Calendar for the equipment scheduled for preventive maintenance Standard and special tool kits required for carrying out the task Consumables, replacement spare parts required	2	4	-	-
PC2.. verify routine check list activities have been conducted by the user-operator	1	4	-	-
PC3.. be part of the team planning new equipment, installations, layout planning etc. so that the maintenance aspect is planned appropriately in the specifications and norms.	1	4	-	-
<i>Carrying out the maintenance activity</i>	16	42	-	-
PC4 .. open the equipment and replace the scheduled spare parts as per the schedule	1	3	-	-
PC5.. check / confirm internal conditions of wiring , motherboards etc. to verify working status to expected conditions. discuss with the user/ operator to learn about problems /unusual phenomenon noticed on the equipment.	2	5	-	-
PC6.. assemble back, covers , guards, clamps, insulation etc. & prepare for taking the trials.	2	4	-	-
PC6.. change the maintenance due / status sticker on the equipment.	1	3	-	-
PC7.. to attend the breakdown maintenance verify in appropriate sequence for the equipment Charge leakage/ short circuit from parts Breakage of wires, clamps Unusual contacts of electrical wires with moving parts Erratic / problematic performance Any problem condition as reported in the complaint	2	5	-	-

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Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
PC8.. plan sequence of activities for changing, correcting the situation after opening, verifying contact/ insulation conditions, failure of internal wires etc. and ensure the circuit elements, consumables are available at the work place.	2	5	-	-
PC9.. use appropriate PPE, material handling equipment and tools and carry out the task . Use recommended methods, consumables, tools for Electrical / electronic connections Verification of continuity joints, including soldered	1	4	-	-
PC10.. take support from experts, user , team members from maintenance during the activity if required.	1	3	-	-
PC11.. clock the time for the task so that the scheduling and planning can be improved in future.	1	3	-	-
PC12.. when carrying out the installation/ shifting activity record the time and unplanned tasks encountered in the activity.	2	4	-	-
PC13.. discuss with seniors in manufacturing, maintenance for improving the activity to ensure all points are adequately considered.	1	3	-	-
<i>Taking the trials & hand over the equipment for manufacturing process</i>	6	12	-	-
PC14.. take trials of running step by step increasing duty conditions gradually and verify specified parameters are attained and no abnormalities achieved,	2	5	-	-
PC15.. study the standard working , running for a few cycles of the equipment to ascertain normal working in presence of the user .	3	4	-	-
PC16.. handover the equipment to the user.	1	3	-	-
<i>Documentation & Records</i>	2	6	-	-
PC17.. update the history sheet with the replacement details .	1	3	-	-

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Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
PC 18 .. discuss with seniors and decide if any change is necessary for preventive schedules based on the breakdown activity.	1	3	-	-
NOS Total	28	72	-	-

Qualification Pack

National Occupational Standards (NOS) Parameters

NOS Code	ASC/N6805
NOS Name	Carry out preventive/breakdown maintenance of the electrical/electronic systems of the equipment
Sector	Automotive
Sub-Sector	Manufacturing and R&D
Occupation	Maintenance
NSQF Level	4
Credits	TBD
Version	1.0
Last Reviewed Date	23/09/2013
Next Review Date	30/09/2015
NSQC Clearance Date	

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.

Recommended Pass % : 70

Assessment Weightage

Compulsory NOS

National Occupational Standards	Theory Marks	Practical Marks	Project Marks	Viva Marks	Total Marks	Weightage
ASC/N0002.Work effectively in a team	25	75	-	-	100	10
ASC/N0006.Maintain a safe and healthy working environment	25	75	-	-	100	10
ASC/N0021.Maintain 5S at the work premises	25	75	-	-	100	10
ASC/N6804.Develop understanding of the equipment	30	70	-	-	100	35

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National Occupational Standards	Theory Marks	Practical Marks	Project Marks	Viva Marks	Total Marks	Weightage
ASC/N6805.Carry out preventive/breakdown maintenance of the electrical/electronic systems of the equipment	28	72	-	-	100	35
Total	133	367	-	-	500	100

Qualification Pack

Acronyms

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

Qualification Pack

Glossary

Sector	Sector is a conglomeration of different business operations having similar business and interests. It may also be defined as a distinct subset of the economy whose components share similar characteristics and interests.
Sub-sector	Sub-sector is derived from a further breakdown based on the characteristics and interests of its components.
Occupation	Occupation is a set of job roles, which perform similar/ related set of functions in an industry.
Job role	Job role defines a unique set of functions that together form a unique employment opportunity in an organisation.
Occupational Standards (OS)	OS specify the standards of performance an individual must achieve when carrying out a function in the workplace, together with the Knowledge and Understanding (KU) they need to meet that standard consistently. Occupational Standards are applicable both in the Indian and global contexts.
Performance Criteria (PC)	Performance Criteria (PC) are statements that together specify the standard of performance required when carrying out a task.
National Occupational Standards (NOS)	NOS are occupational standards which apply uniquely in the Indian context.
Qualifications Pack (QP)	QP comprises the set of OS, together with the educational, training and other criteria required to perform a job role. A QP is assigned a unique qualifications pack code.
Unit Code	Unit code is a unique identifier for an Occupational Standard, which is denoted by an 'N'
Unit Title	Unit title gives a clear overall statement about what the incumbent should be able to do.
Description	Description gives a short summary of the unit content. This would be helpful to anyone searching on a database to verify that this is the appropriate OS they are looking for.
Scope	Scope is a set of statements specifying the range of variables that an individual may have to deal with in carrying out the function which have a critical impact on quality of performance required.

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Knowledge and Understanding (KU)	Knowledge and Understanding (KU) are statements which together specify the technical, generic, professional and organisational specific knowledge that an individual needs in order to perform to the required standard.
Organisational Context	Organisational context includes the way the organisation is structured and how it operates, including the extent of operative knowledge managers have of their relevant areas of responsibility.
Technical Knowledge	Technical knowledge is the specific knowledge needed to accomplish specific designated responsibilities.
Core Skills/ Generic Skills (GS)	Core skills or Generic Skills (GS) are a group of skills that are the key to learning and working in today's world. These skills are typically needed in any work environment in today's world. These skills are typically needed in any work environment. In the context of the OS, these include communication related skills that are applicable to most job roles.
Electives	Electives are NOS/set of NOS that are identified by the sector as contributive to specialization in a job role. There may be multiple electives within a QP for each specialized job role. Trainees must select at least one elective for the successful completion of a QP with Electives.
Options	Options are NOS/set of NOS that are identified by the sector as additional skills. There may be multiple options within a QP. It is not mandatory to select any of the options to complete a QP with Options.