

## Qualification Pack



# MEP Supervisor - Maintenance

Options: Supervise the use and control of BMS

QP Code: ICE/CON/Q1001

Version: 1.0

NSQF Level: 5

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## Qualification Pack

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### ICE/CON/Q1001: MEP Supervisor - Maintenance

#### Brief Job Description

A MEP Supervisor - Maintenance supervises the maintenance and repair of Mechanical, Electrical and Plumbing (MEP) systems in a building. The individual also uses computer and applies appropriate IT skills in work. The person may optionally supervise the maintenance of the infrastructure and use of the Building Management Systems (BMS).

#### Personal Attributes

The individual should be physically fit and mentally alert. The person should have appropriate verbal and written communication skills and the ability to cooperate with others.

#### Applicable National Occupational Standards (NOS)

##### Compulsory NOS:

1. [ICE/CON/N1005: Supervise the Maintenance and Repair of Mechanical Systems](#)
2. [ICE/CON/N1002: Supervise the Electrical Works](#)
3. [ICE/CON/N1004: Supervise the Maintenance and Repair of the Plumbing System](#)
4. [ICE/CON/N1003: Apply Computer and IT Skills at Work](#)
5. [ICE/CON/N1006: Ensure Adherence to Health and Safety Guidelines at Work](#)
6. [DGT/VSQ/N0102: Employability Skills \(60 Hours\)](#)

##### Options(Not mandatory):

Option : Supervise the use and control of BMS

This unit is about supervising the use and control of the BMS.

1. [ICE/CON/N1001: Supervise the Use and Control of BMS](#)

#### Qualification Pack (QP) Parameters

<b>Sector</b>	Construction
<b>Sub-Sector</b>	Real Estate and Infrastructure Construction

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<b>Occupation</b>	MEP Supervision - Maintenance
<b>Country</b>	India
<b>NSQF Level</b>	5
<b>Credits</b>	20
<b>Aligned to NCO/ISCO/ISIC Code</b>	NCO-2015/3123.0302 & 3123.0400 & 3122.5600
<b>Minimum Educational Qualification &amp; Experience</b>	<p>2-year Diploma after 12th grade (in any field) (in Civil OR Mechanical OR Electrical) with 1 Year of experience in relevant field</p> <p>OR</p> <p>Completed 3 year diploma after 10th ((in Civil OR Mechanical OR Electrical) with 1.5 years of experience in relevant field</p> <p>OR</p> <p>12th grade Pass with 3 Years of experience in relevant field</p> <p>OR</p> <p>Previous relevant Qualification of NSQF Level (4.0) with 3 Years of experience in relevant field</p> <p>OR</p> <p>Previous relevant Qualification of NSQF Level (4.5) with 1.5 years of experience in relevant field</p>
<b>Minimum Level of Education for Training in School</b>	
<b>Pre-Requisite License or Training</b>	NA
<b>Minimum Job Entry Age</b>	20 Years
<b>Last Reviewed On</b>	NA
<b>Next Review Date</b>	30/05/2027
<b>NSQC Approval Date</b>	30/05/2024
<b>Version</b>	1.0
<b>Reference code on NQR</b>	QG-05-CO-02636-2024-V1-TICE
<b>NQR Version</b>	1

## Qualification Pack

# ICE/CON/N1005: Supervise the Maintenance and Repair of Mechanical Systems

## Description

This unit is about supervising the maintenance and repair of mechanical systems.

## Scope

The scope covers the following :

- Prepare for maintenance and repair work.
- Supervise the maintenance and repair work.

## Elements and Performance Criteria

### *Prepare for maintenance and repair work*

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

- PC1.** inspect the mechanical systems and identify and document any existing issues or potential areas of concern
- PC2.** review the mechanical drawings, specifications and engineering plans, including HVAC drawings
- PC3.** conduct site survey to identify any constraints to repair and maintenance work
- PC4.** develop a maintenance plan outlining regular inspection schedules, preventive maintenance tasks, and a timeline for repairs
- PC5.** create a maintenance schedule to minimise disruption to building occupants
- PC6.** schedule and coordinate contractor visits, ensuring they are briefed on the scope of work and building protocols

### *Supervise the maintenance and repair work*

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

- PC7.** ensure all necessary materials, tools, and equipment are available for the maintenance and repair work
- PC8.** review safety procedures and ensure all team members are aware of them
- PC9.** monitor the maintenance or repair work to ensure it is performed according to the maintenance plan and safety standards
- PC10.** identify and address any unforeseen issues that arise during the repair and maintenance process
- PC11.** conduct inspection of the completed work to ensure the mechanical systems work correctly
- PC12.** ensure the repair and maintenance work meets the applicable standards and specifications
- PC13.** perform functional tests on repaired or maintained systems to ensure they are working as intended.
- PC14.** implement improvements to enhance efficiency, safety, and reliability of mechanical systems
- PC15.** maintain detailed records of all maintenance and repair activities

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- PC16.** provide reports to the building owner/ management, highlighting completed work, and any upgrade recommendations

### Knowledge and Understanding (KU)

The individual on the job needs to know and understand:

- KU1.** the operation, troubleshooting, and maintenance of HVAC systems
- KU2.** the basics of electrical circuits, control systems, and safety protocols
- KU3.** how to read mechanical drawings, specifications and engineering plans, including HVAC drawings
- KU4.** the structural work required in a building for carrying out MEP work
- KU5.** how to read building Structural drawings
- KU6.** the process of developing and implementing a maintenance plan for mechanical systems
- KU7.** the appropriate maintenance schedule for mechanical systems
- KU8.** the maintenance of fire protection systems
- KU9.** the maintenance and safety inspections of elevators and escalators
- KU10.** how to diagnose and troubleshoot mechanical issues
- KU11.** the repair methods and techniques relevant to mechanical systems
- KU12.** the interaction of mechanical systems with electrical systems
- KU13.** the routine maintenance of mechanical systems to prevent breakdowns
- KU14.** the operation and maintenance of heavy-duty machines used in mechanical works
- KU15.** the materials, tools and equipment used in the maintenance and repair of mechanical systems
- KU16.** the applicable occupational health and safety regulations, including the implementation of safety protocols
- KU17.** the applicable building codes
- KU18.** how to plan and schedule maintenance tasks efficiently
- KU19.** resource management, including manpower, materials, and budgets
- KU20.** the applicable quality control procedures to ensure the quality of repairs and maintenance work meets the relevant standards
- KU21.** the applicable records-maintenance requirements

### Generic Skills (GS)

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

- GS1.** maintain the appropriate data and records
- GS2.** read the appropriate reports and literature concerning the field of work
- GS3.** communicate professionally with all the stakeholders
- GS4.** listen attentively to understand the information/ instructions being shared and take appropriate action
- GS5.** coordinate with the co-workers to achieve the work objectives



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- GS6.** identify possible disruptions to work and take appropriate mitigation measures
- GS7.** take prompt action to deal with workplace emergencies and accidents
- GS8.** evaluate all possible solutions to work-related problems and select the best one
- GS9.** follow the recommended practices for the timely completion of work and achievement of organizational objectives

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### Assessment Criteria

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
<i>Prepare for maintenance and repair work</i>	<b>14</b>	<b>20</b>	-	<b>8</b>
<b>PC1.</b> inspect the mechanical systems and identify and document any existing issues or potential areas of concern	-	-	-	-
<b>PC2.</b> review the mechanical drawings, specifications and engineering plans, including HVAC drawings	-	-	-	-
<b>PC3.</b> conduct site survey to identify any constraints to repair and maintenance work	-	-	-	-
<b>PC4.</b> develop a maintenance plan outlining regular inspection schedules, preventive maintenance tasks, and a timeline for repairs	-	-	-	-
<b>PC5.</b> create a maintenance schedule to minimise disruption to building occupants	-	-	-	-
<b>PC6.</b> schedule and coordinate contractor visits, ensuring they are briefed on the scope of work and building protocols	-	-	-	-
<i>Supervise the maintenance and repair work</i>	<b>16</b>	<b>30</b>	-	<b>12</b>
<b>PC7.</b> ensure all necessary materials, tools, and equipment are available for the maintenance and repair work	-	-	-	-
<b>PC8.</b> review safety procedures and ensure all team members are aware of them	-	-	-	-
<b>PC9.</b> monitor the maintenance or repair work to ensure it is performed according to the maintenance plan and safety standards	-	-	-	-
<b>PC10.</b> identify and address any unforeseen issues that arise during the repair and maintenance process	-	-	-	-
<b>PC11.</b> conduct inspection of the completed work to ensure the mechanical systems work correctly	-	-	-	-



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Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
<b>PC12.</b> ensure the repair and maintenance work meets the applicable standards and specifications	-	-	-	-
<b>PC13.</b> perform functional tests on repaired or maintained systems to ensure they are working as intended.	-	-	-	-
<b>PC14.</b> implement improvements to enhance efficiency, safety, and reliability of mechanical systems	-	-	-	-
<b>PC15.</b> maintain detailed records of all maintenance and repair activities	-	-	-	-
<b>PC16.</b> provide reports to the building owner/ management, highlighting completed work, and any upgrade recommendations	-	-	-	-
<b>NOS Total</b>	<b>30</b>	<b>50</b>	<b>-</b>	<b>20</b>

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### National Occupational Standards (NOS) Parameters

<b>NOS Code</b>	ICE/CON/N1005
<b>NOS Name</b>	Supervise the Maintenance and Repair of Mechanical Systems
<b>Sector</b>	Construction
<b>Sub-Sector</b>	
<b>Occupation</b>	MEP Supervision - Maintenance
<b>NSQF Level</b>	5
<b>Credits</b>	4
<b>Version</b>	1.0
<b>Last Reviewed Date</b>	30/05/2024
<b>Next Review Date</b>	30/05/2027
<b>NSQC Clearance Date</b>	30/05/2024

## Qualification Pack

### ICE/CON/N1002: Supervise the Electrical Works

#### Description

This unit is about supervising the electrical works to ensure they are carried out as per the applicable safety and quality standards.

#### Scope

The scope covers the following :

- Arrange the appropriate tools and equipment
- Supervise the use of tools and equipment
- Check the electrical material components and fixtures
- Supervise the maintenance of HVAC equipment
- Inspect the generator operation
- Supervise the maintenance of generators
- Supervise electrical maintenance and repairs
- Supervise conduit laying and LV wiring processes

#### Elements and Performance Criteria

##### *Arrange the appropriate tools and equipment*

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

- PC1.** ensure the availability of appropriate tools and equipment, e.g. electrical measuring device and multimeter based on the work requirements
- PC2.** supervise appropriate checks on the equipment to ensure their correct functioning and usability
- PC3.** direct the relevant workers to carry out appropriate troubleshooting for any issues identified with the tools and equipment

##### *Supervise the use of tools and equipment*

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

- PC4.** ensure the use of appropriate tools and equipment to examine electrical units in power interruptions/ continuity and trace short circuits/faults and leakages in the electrical wiring
- PC5.** direct the workers to measure the size and dimension of wires and conduits using the appropriate tools
- PC6.** check for the use of proper tools to cut and bend wires and conduits
- PC7.** direct the workers to splice wires by stripping insulation from terminal leads and twisting wires together with the help of relevant tools
- PC8.** ensure proper threading of conduit ends as per the standard procedure
- PC9.** instruct the workers to connect couplings and fabricate and secure conduit support brackets using the appropriate tools
- PC10.** supervise the use of digital ammeter, multimeter, tong tester, earth tester or similar devices for the repair of power connections

##### *Check the electrical material components and fixtures*

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

- PC11.** ensure the use of appropriate cables, conduits, lights, sockets, temporary power distribution panels and other required fixtures and accessories for repairs
- PC12.** use lights with appropriate illumination to replace the faulty lights
- PC13.** ensure the use of relevant accessories, brackets, bulkheads, screws and bolts for fixing lights
- PC14.** instruct the workers to lay cables through ducts or conduits, pull wires through conduit leading to connection boxes, temporary panels/ distribution boards or other temporary electrical terminals
- PC15.** check for the splicing of cables together using secured joints, i.e. PVC insulation tapes, caps, etc.
- PC16.** direct the workers to terminate Low-Voltage (LV) cables and tag embedded, exposed electrical lines and other key equipment appropriately

### *Supervise the maintenance of HVAC equipment*

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

- PC17.** check the components of the critical HVAC system for the correct functioning
- PC18.** ensure the workers understand the mechanical drawings for HVAC equipment
- PC19.** inspect the compressor for appropriate functioning and identify the common problems arising from the failure of the compressor
- PC20.** ensure the applicable procedures and checklists are followed for the preventive, predictive and corrective maintenance of the HVAC equipment/system
- PC21.** check for the functionality of various control components, such as the thermostat, time delay relay, solenoid valves, relays and contactors
- PC22.** check for the functionality of various control components such as the thermostat, time delay relay, solenoid valves, relays and contactors
- PC23.** analyse circuit diagrams to determine the operating sequence of micro-processor-controlled systems

### *Inspect the generator operation*

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

- PC24.** monitor the Diesel Generator (DG) parts and their parameters, such as daily panel reading, battery charging current, specific gravity terminal connection, diesel level, oil level, coolant level and air cleaner of the DG
- PC25.** implement the appropriate safety measures to mitigate the operational hazard concerning a DG
- PC26.** identify the electrical hazards associated with automatic transfer switch, bad wiring connections, DC batteries (24-to-30-volt DC), generator voltage (415 VAC) and implement appropriate preventive measures
- PC27.** identify the chemical hazards associated with the battery, diesel, and engine oil, and implement appropriate preventive measures
- PC28.** identify the mechanical and thermal hazards associated with diesel engines (moving parts) hot exhaust, mufflers, engine surface eye hazard, and battery wash splash, and implement appropriate preventive measures
- PC29.** identify the air hazard and symptoms of carbon monoxide poisoning, and implement appropriate preventive and remedial measures
- PC30.** ensure the appropriate procedure of starting and stopping DG is followed

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- PC31.** identify the fire hazards and implement the appropriate fire safety measures
- PC32.** inspect the regulation of the flow of power from the generator to the connecting load to match the phase sequence, frequency and voltage

### *Supervise the maintenance of generators*

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

- PC33.** monitor and map the performance of diesel generators
- PC34.** identify the problems associated with the operation of DG and ensure their resolution within the specified time
- PC35.** check for the use of appropriate spares and tools for the maintenance work
- PC36.** implement the standard procedure for the Planned Preventative Maintenance (PPM) of the DG to reduce breakdowns

### *Supervise electrical maintenance and repairs*

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

- PC37.** ensure the safety of live cable connections
- PC38.** instruct the workers to shift light arrangements as per the requirement safely, disconnecting the live parts
- PC39.** inspect the repair and replacement of light arrangements through relevant tests to trace out power interruptions
- PC40.** direct the workers to carry out maintenance by replacing/repairing installed electrical components
- PC41.** supervise the maintenance and replacement of faulty cables, bulbs/tubes, wires, electrical switches, faulty electrical equipment etc.
- PC42.** inspect the necessary tests to shut down, deactivate or repair
- PC43.** ensure the replacement and repair of faulty components as per SLD instruction
- PC44.** ensure safe isolation and shifting of the panel to another location as and when necessary
- PC45.** carry out necessary documentation, keeping records relevant to maintenance of panels as per organizational norms

### *Supervise conduit laying and LV wiring processes*

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

- PC46.** conduct a thorough assessment of the electrical system to identify the areas needing repair or rewiring
- PC47.** determine the scope of work, including the type and quantity of conduits and LV wiring required.
- PC48.** develop a detailed plan outlining the conduiting and wiring routes
- PC49.** select appropriate conduit types ensuring their correct size to accommodate the wiring without overcrowding
- PC50.** select the appropriate type and gauge of LV wiring
- PC51.** check the wiring meets the required specifications for the intended use
- PC52.** ensure the power is turned off to the work area
- PC53.** implement lockout/tagout procedures to prevent accidental energization
- PC54.** ensure the conduit runs according to the planned routes
- PC55.** monitor bending of conduits to allow them fit around corners and obstacles

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- PC56.** ensure conduits are secured to walls, ceilings, or other surfaces using appropriate clamps and brackets
- PC57.** supervise the labelling and terminating of wires as per the applicable standards
- PC58.** perform continuity tests to verify that the wiring is intact and correctly routed.
- PC59.** test the LV systems to ensure they operate correctly

## Knowledge and Understanding (KU)

The individual on the job needs to know and understand:

- KU1.** how electricity works
- KU2.** different types of materials, e.g. conductors, insulators, and semiconductors
- KU3.** the concepts of current, potential difference, Electromotive force (EMF)
- KU4.** ohms law, resistance, series and parallel
- KU5.** ohms law practical
- KU6.** voltage drop in the circuit, voltage divider rule, series and parallel
- KU7.** circuit connections
- KU8.** electrical work, power & energy
- KU9.** the measurement of voltage, current, power and energy
- KU10.** effects of electric current - heating, magnetic, chemical, etc.
- KU11.** voltage and current
- KU12.** the effects of electric current
- KU13.** the difference between AC and DC
- KU14.** the advantages of AC over DC
- KU15.** the sinusoidal wave
- KU16.** the concept of resistance, capacitance and inductance
- KU17.** the difference between R-L, R-C, and R-L-C series circuits
- KU18.** the concept of active, reactive, and apparent power
- KU19.** the power factor and improvement
- KU20.** the power triangle
- KU21.** the principle of 3-phase EMF generation and its waveform
- KU22.** the concept of load balancing
- KU23.** the electricity supply system and utilization
- KU24.** the electricity generation and transmission
- KU25.** the tariff concept, utilization and electricity bill calculation
- KU26.** the importance and functioning of a power plant
- KU27.** the use of different electrical symbols as per rules
- KU28.** the design of simple electric circuits
- KU29.** the use of parallel circuits and master-switch circuits
- KU30.** the procedure of laying electrical wiring as per the drawing
- KU31.** the meaning and use of different MEP Symbols

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- KU32.** the use of appropriate tools and equipment for electrical works
- KU33.** the selection of appropriate wire size according to project requirements
- KU34.** the preparation of electrical diagrams using standard electrical circuit symbols
- KU35.** the observation of standard components
- KU36.** how to read and interpret electrical installation drawings
- KU37.** lamp circuits -Simple electric circuits, 1 lamp by 1 switch, etc.
- KU38.** the procedure of godown and staircase wiring
- KU39.** different types of light fixtures, e.g. direct, semi-direct and indirect
- KU40.** the installation of light fittings
- KU41.** general and factory lighting
- KU42.** the procedure of diffusing fittings
- KU43.** the use of concentrating reflectors
- KU44.** different types of pumps and their operations
- KU45.** different types of motors and motor starting connections
- KU46.** the functioning and types of transformers
- KU47.** the wiring and parts of a transformer, and their functions
- KU48.** the transformer cooling system
- KU49.** the functioning of breakers, substation equipment, electrical panels and distribution Boards (DB)
- KU50.** the use of Automatic Power Factor Control (APFC) Panel
- KU51.** the basic electronics
- KU52.** the basic electronic components and circuits
- KU53.** the use of electronic circuit diagrams
- KU54.** the basic low-voltage systems, such as TV, telephone, etc.
- KU55.** the use of the Internet, intercom and security systems
- KU56.** the functioning of fire sensors
- KU57.** the rules of electronic connections
- KU58.** the use of batteries and cells
- KU59.** the current capacity and rating of a battery
- KU60.** the working and connections of inverters and UPS
- KU61.** the use of generators in residences, malls and hotels
- KU62.** the operation and maintenance of electrical control panels
- KU63.** basic Mathematics - Percentage, Probability, Ratio, Proportion, Geometry, Histogram and Graphs
- KU64.** basic Physics -Speed, Acceleration, Force, Newton's Law, Power, and Temperature
- KU65.** physical quantities, units and conversions
- KU66.** the application of mathematics and physics in electrical works, e.g. calculation of power requirement
- KU67.** the Indian Electricity (IE) rules for domestic and industrial wiring
- KU68.** different methods of wiring

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- KU69.** the types and usage of wires and cables
- KU70.** the types and sizes of wires and cables for connection
- KU71.** the appropriate cabling and earthing as per IE rules
- KU72.** different wiring accessories
- KU73.** different types of conduiting
- KU74.** different conduit pipe wiring materials
- KU75.** the advantages and disadvantages of concealed conduiting
- KU76.** the necessity of fuses, circuit breakers, rating MCB, ELCB, relays, etc.

## Generic Skills (GS)

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

- GS1.** maintain the appropriate data and records
- GS2.** read the appropriate reports and literature concerning the field of work
- GS3.** communicate professionally with all the stakeholders
- GS4.** listen attentively to understand the information/ instructions being shared and take appropriate action
- GS5.** coordinate with the co-workers to achieve the work objectives
- GS6.** identify possible disruptions to work and take appropriate mitigation measures
- GS7.** take prompt action to deal with workplace emergencies and accidents
- GS8.** evaluate all possible solutions to work-related problems and select the best one
- GS9.** follow the recommended practices for the timely completion of work and achievement of organizational objectives



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### Assessment Criteria

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
<i>Arrange the appropriate tools and equipment</i>	2	7	-	2
<b>PC1.</b> ensure the availability of appropriate tools and equipment, e.g. electrical measuring device and multimeter based on the work requirements	-	-	-	-
<b>PC2.</b> supervise appropriate checks on the equipment to ensure their correct functioning and usability	-	-	-	-
<b>PC3.</b> direct the relevant workers to carry out appropriate troubleshooting for any issues identified with the tools and equipment	-	-	-	-
<i>Supervise the use of tools and equipment</i>	4	9	-	3
<b>PC4.</b> ensure the use of appropriate tools and equipment to examine electrical units in power interruptions/ continuity and trace short circuits/faults and leakages in the electrical wiring	-	-	-	-
<b>PC5.</b> direct the workers to measure the size and dimension of wires and conduits using the appropriate tools	-	-	-	-
<b>PC6.</b> check for the use of proper tools to cut and bend wires and conduits	-	-	-	-
<b>PC7.</b> direct the workers to splice wires by stripping insulation from terminal leads and twisting wires together with the help of relevant tools	-	-	-	-
<b>PC8.</b> ensure proper threading of conduit ends as per the standard procedure	-	-	-	-
<b>PC9.</b> instruct the workers to connect couplings and fabricate and secure conduit support brackets using the appropriate tools	-	-	-	-
<b>PC10.</b> supervise the use of digital ammeter, multimeter, tong tester, earth tester or similar devices for the repair of power connections	-	-	-	-
<i>Check the electrical material components and fixtures</i>	4	7	-	3

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Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
<b>PC11.</b> ensure the use of appropriate cables, conduits, lights, sockets, temporary power distribution panels and other required fixtures and accessories for repairs	-	-	-	-
<b>PC12.</b> use lights with appropriate illumination to replace the faulty lights	-	-	-	-
<b>PC13.</b> ensure the use of relevant accessories, brackets, bulkheads, screws and bolts for fixing lights	-	-	-	-
<b>PC14.</b> instruct the workers to lay cables through ducts or conduits, pull wires through conduit leading to connection boxes, temporary panels/ distribution boards or other temporary electrical terminals	-	-	-	-
<b>PC15.</b> check for the splicing of cables together using secured joints, i.e. PVC insulation tapes, caps, etc.	-	-	-	-
<b>PC16.</b> direct the workers to terminate Low-Voltage (LV) cables and tag embedded, exposed electrical lines and other key equipment appropriately	-	-	-	-
<i>Supervise the maintenance of HVAC equipment</i>	<b>6</b>	<b>7</b>	-	<b>2</b>
<b>PC17.</b> check the components of the critical HVAC system for the correct functioning	-	-	-	-
<b>PC18.</b> ensure the workers understand the mechanical drawings for HVAC equipment	-	-	-	-
<b>PC19.</b> inspect the compressor for appropriate functioning and identify the common problems arising from the failure of the compressor	-	-	-	-
<b>PC20.</b> ensure the applicable procedures and checklists are followed for the preventive, predictive and corrective maintenance of the HVAC equipment/system	-	-	-	-
<b>PC21.</b> check for the functionality of various control components, such as the thermostat, time delay relay, solenoid valves, relays and contactors	-	-	-	-
<b>PC22.</b> check for the functionality of various control components such as the thermostat, time delay relay, solenoid valves, relays and contactors	-	-	-	-

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Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
<b>PC23.</b> analyse circuit diagrams to determine the operating sequence of micro-processor-controlled systems	-	-	-	-
<i>Inspect the generator operation</i>	<b>4</b>	<b>5</b>	-	<b>2</b>
<b>PC24.</b> monitor the Diesel Generator (DG) parts and their parameters, such as daily panel reading, battery charging current, specific gravity terminal connection, diesel level, oil level, coolant level and air cleaner of the DG	-	-	-	-
<b>PC25.</b> implement the appropriate safety measures to mitigate the operational hazard concerning a DG	-	-	-	-
<b>PC26.</b> identify the electrical hazards associated with automatic transfer switch, bad wiring connections, DC batteries (24-to-30-volt DC), generator voltage (415 VAC) and implement appropriate preventive measures	-	-	-	-
<b>PC27.</b> identify the chemical hazards associated with the battery, diesel, and engine oil, and implement appropriate preventive measures	-	-	-	-
<b>PC28.</b> identify the mechanical and thermal hazards associated with diesel engines (moving parts) hot exhaust, mufflers, engine surface eye hazard, and battery wash splash, and implement appropriate preventive measures	-	-	-	-
<b>PC29.</b> identify the air hazard and symptoms of carbon monoxide poisoning, and implement appropriate preventive and remedial measures	-	-	-	-
<b>PC30.</b> ensure the appropriate procedure of starting and stopping DG is followed	-	-	-	-
<b>PC31.</b> identify the fire hazards and implement the appropriate fire safety measures	-	-	-	-
<b>PC32.</b> inspect the regulation of the flow of power from the generator to the connecting load to match the phase sequence, frequency and voltage	-	-	-	-
<i>Supervise the maintenance of generators</i>	<b>2</b>	<b>4</b>	-	<b>3</b>

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Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
<b>PC33.</b> monitor and map the performance of diesel generators	-	-	-	-
<b>PC34.</b> identify the problems associated with the operation of DG and ensure their resolution within the specified time	-	-	-	-
<b>PC35.</b> check for the use of appropriate spares and tools for the maintenance work	-	-	-	-
<b>PC36.</b> implement the standard procedure for the Planned Preventative Maintenance (PPM) of the DG to reduce breakdowns	-	-	-	-
<i>Supervise electrical maintenance and repairs</i>	<b>3</b>	<b>5</b>	-	<b>2</b>
<b>PC37.</b> ensure the safety of live cable connections	-	-	-	-
<b>PC38.</b> instruct the workers to shift light arrangements as per the requirement safely, disconnecting the live parts	-	-	-	-
<b>PC39.</b> inspect the repair and replacement of light arrangements through relevant tests to trace out power interruptions	-	-	-	-
<b>PC40.</b> direct the workers to carry out maintenance by replacing/repairing installed electrical components	-	-	-	-
<b>PC41.</b> supervise the maintenance and replacement of faulty cables, bulbs/tubes, wires, electrical switches, faulty electrical equipment etc.	-	-	-	-
<b>PC42.</b> inspect the necessary tests to shut down, deactivate or repair	-	-	-	-
<b>PC43.</b> ensure the replacement and repair of faulty components as per SLD instruction	-	-	-	-
<b>PC44.</b> ensure safe isolation and shifting of the panel to another location as and when necessary	-	-	-	-
<b>PC45.</b> carry out necessary documentation, keeping records relevant to maintenance of panels as per organizational norms	-	-	-	-
<i>Supervise conduit laying and LV wiring processes</i>	<b>5</b>	<b>6</b>	-	<b>3</b>

### Qualification Pack

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
<b>PC46.</b> conduct a thorough assessment of the electrical system to identify the areas needing repair or rewiring	-	-	-	-
<b>PC47.</b> determine the scope of work, including the type and quantity of conduits and LV wiring required.	-	-	-	-
<b>PC48.</b> develop a detailed plan outlining the conduiting and wiring routes	-	-	-	-
<b>PC49.</b> select appropriate conduit types ensuring their correct size to accommodate the wiring without overcrowding	-	-	-	-
<b>PC50.</b> select the appropriate type and gauge of LV wiring	-	-	-	-
<b>PC51.</b> check the wiring meets the required specifications for the intended use	-	-	-	-
<b>PC52.</b> ensure the power is turned off to the work area	-	-	-	-
<b>PC53.</b> implement lockout/tagout procedures to prevent accidental energization	-	-	-	-
<b>PC54.</b> ensure the conduit runs according to the planned routes	-	-	-	-
<b>PC55.</b> monitor bending of conduits to allow them fit around corners and obstacles	-	-	-	-
<b>PC56.</b> ensure conduits are secured to walls, ceilings, or other surfaces using appropriate clamps and brackets	-	-	-	-
<b>PC57.</b> supervise the labelling and terminating of wires as per the applicable standards	-	-	-	-
<b>PC58.</b> perform continuity tests to verify that the wiring is intact and correctly routed.	-	-	-	-
<b>PC59.</b> test the LV systems to ensure they operate correctly	-	-	-	-
<b>NOS Total</b>	<b>30</b>	<b>50</b>	<b>-</b>	<b>20</b>

## Qualification Pack

### National Occupational Standards (NOS) Parameters

<b>NOS Code</b>	ICE/CON/N1002
<b>NOS Name</b>	Supervise the Electrical Works
<b>Sector</b>	Construction
<b>Sub-Sector</b>	
<b>Occupation</b>	MEP Supervision - Maintenance
<b>NSQF Level</b>	5
<b>Credits</b>	5
<b>Version</b>	1.0
<b>Last Reviewed Date</b>	30/05/2024
<b>Next Review Date</b>	30/05/2027
<b>NSQC Clearance Date</b>	30/05/2024

## Qualification Pack

# ICE/CON/N1004: Supervise the Maintenance and Repair of the Plumbing System

## Description

This unit is about supervising the plumbing work and maintenance of the plumbing system.

## Scope

The scope covers the following :

- Plan the plumbing maintenance and repair tasks
- Supervise the maintenance and repair tasks

## Elements and Performance Criteria

### *Plan the plumbing maintenance and repair tasks*

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

- PC1.** inspect the plumbing system to identify any existing issues, potential problem areas, and necessary maintenance tasks
- PC2.** analyse the plumbing system drawings to plan the maintenance and repair activities
- PC3.** document the condition of pipes, fixtures, valves, and other components
- PC4.** develop a maintenance plan outlining regular inspection schedules, preventive maintenance tasks, and a timeline for repairs
- PC5.** ensure the availability of appropriate materials, tools and equipment for maintenance and repair of plumbing systems

### *Supervise the maintenance and repair tasks*

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

- PC6.** check the plumbing system to identify potential problems/faults and their cause
- PC7.** implement the appropriate sequence for the repair of the plumbing system
- PC8.** supervise the assembling of fitting and fixtures and appropriate tools required for different plumbing tasks
- PC9.** locate and mark the position of the component to be replaced/repared, using measuring instruments such as rulers and levels
- PC10.** direct the workers to cut openings in structures to remove defective pipes and pipe fittings, using the appropriate hand and power tools
- PC11.** ensure the replacement of faulty pipe assemblies, fittings, valves, appliances such as dishwashers/water heaters, and fixtures such as sinks and toilets with the new ones using the appropriate hand and power tools
- PC12.** test the joints and fixtures for the proper functioning
- PC13.** implement appropriate measures to prevent water leakage
- PC14.** supervise various activities for the maintenance of the plumbing system, e.g. installing water service lines, connecting with the main line, fixing leaky pipes, repairing/ replacing broken water pipes, repairing/replacing leaky taps, replacing blocked pipes, etc.

## Qualification Pack

- PC15.** ensure the plumbing tasks are performed within the applicable durations
- PC16.** implement the appropriate measures to achieve quality finishing in the repair of sanitary fixtures and fittings
- PC17.** ensure minimal wastage of material and minimal damage to other systems
- PC18.** instruct the workers to clean the plumbing work area after work and dispose of waste safely, following the applicable waste management practices

## Knowledge and Understanding (KU)

The individual on the job needs to know and understand:

- KU1.** how to read and interpret plumbing drawings
- KU2.** different types of pipes and pipe materials
- KU3.** different types of pipe joints
- KU4.** different types of taps and valves
- KU5.** the piping layout
- KU6.** the placement and installation of pipe assemblies
- KU7.** the cutting, threading and bending procedures
- KU8.** sanitary and kitchenware
- KU9.** the regular maintenance of plumbing systems
- KU10.** the preparation of the plumbing system repair sequence
- KU11.** the assessment/ inspection and rectification of faults in the plumbing system, e.g. clearing choked pipes and blockages
- KU12.** how to identify the leakage in the premises and the use of appropriate hardware for the identification of active leak and passive leak
- KU13.** the selection and use of appropriate plumbing tools, equipment and accessories
- KU14.** how to assemble different types of pipe sections, tubings and fittings
- KU15.** how to plan and carry out plumbing work around obstructions
- KU16.** the procedure of checking the plumbing system to identify faults
- KU17.** various activities carried out for the maintenance of the plumbing system, e.g. installing water service lines, connecting with the main line, fixing leaky pipes, repairing/ replacing broken water pipes, repairing/replacing leaky taps, replacing blocked pipes, etc.
- KU18.** the practices for effective vendor management and communication
- KU19.** different types of tests conducted on plumbing systems, including tests on joints and fixtures
- KU20.** the operation of effluent/waste treatment plant, including waste water
- KU21.** the Sewage Treatment Plant (STP) Reverse Osmosis (RO) plant principle
- KU22.** the operation of the sewage treatment plant and drainage system
- KU23.** the water testing and safety standards
- KU24.** the water tank cleaning process
- KU25.** the operation of the hydro-pneumatic system
- KU26.** the operation and maintenance of control panels for plumbing systems
- KU27.** the use and maintenance of different types of pumps



## Qualification Pack

**KU28.** the process of pumping water using water pumps

### Generic Skills (GS)

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

- GS1.** maintain the appropriate data and records
- GS2.** read the appropriate reports and literature concerning the field of work
- GS3.** communicate professionally with all the stakeholders
- GS4.** listen attentively to understand the information/ instructions being shared and take appropriate action
- GS5.** coordinate with the co-workers to achieve the work objectives
- GS6.** identify possible disruptions to work and take appropriate mitigation measures
- GS7.** take prompt action to deal with workplace emergencies and accidents
- GS8.** evaluate all possible solutions to work-related problems and select the best one
- GS9.** follow the recommended practices for the timely completion of work and achievement of organizational objectives

## Qualification Pack

### Assessment Criteria

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
<i>Plan the plumbing maintenance and repair tasks</i>	<b>16</b>	<b>25</b>	-	<b>9</b>
<b>PC1.</b> inspect the plumbing system to identify any existing issues, potential problem areas, and necessary maintenance tasks	-	-	-	-
<b>PC2.</b> analyse the plumbing system drawings to plan the maintenance and repair activities	-	-	-	-
<b>PC3.</b> document the condition of pipes, fixtures, valves, and other components	-	-	-	-
<b>PC4.</b> develop a maintenance plan outlining regular inspection schedules, preventive maintenance tasks, and a timeline for repairs	-	-	-	-
<b>PC5.</b> ensure the availability of appropriate materials, tools and equipment for maintenance and repair of plumbing systems	-	-	-	-
<i>Supervise the maintenance and repair tasks</i>	<b>14</b>	<b>25</b>	-	<b>11</b>
<b>PC6.</b> check the plumbing system to identify potential problems/faults and their cause	-	-	-	-
<b>PC7.</b> implement the appropriate sequence for the repair of the plumbing system	-	-	-	-
<b>PC8.</b> supervise the assembling of fitting and fixtures and appropriate tools required for different plumbing tasks	-	-	-	-
<b>PC9.</b> locate and mark the position of the component to be replaced/repared, using measuring instruments such as rulers and levels	-	-	-	-
<b>PC10.</b> direct the workers to cut openings in structures to remove defective pipes and pipe fittings, using the appropriate hand and power tools	-	-	-	-
<b>PC11.</b> ensure the replacement of faulty pipe assemblies, fittings, valves, appliances such as dishwashers/water heaters, and fixtures such as sinks and toilets with the new ones using the appropriate hand and power tools	-	-	-	-

### Qualification Pack

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
<b>PC12.</b> test the joints and fixtures for the proper functioning	-	-	-	-
<b>PC13.</b> implement appropriate measures to prevent water leakage	-	-	-	-
<b>PC14.</b> supervise various activities for the maintenance of the plumbing system, e.g. installing water service lines, connecting with the main line, fixing leaky pipes, repairing/ replacing broken water pipes, repairing/replacing leaky taps, replacing blocked pipes, etc.	-	-	-	-
<b>PC15.</b> ensure the plumbing tasks are performed within the applicable durations	-	-	-	-
<b>PC16.</b> implement the appropriate measures to achieve quality finishing in the repair of sanitary fixtures and fittings	-	-	-	-
<b>PC17.</b> ensure minimal wastage of material and minimal damage to other systems	-	-	-	-
<b>PC18.</b> instruct the workers to clean the plumbing work area after work and dispose of waste safely, following the applicable waste management practices	-	-	-	-
<b>NOS Total</b>	<b>30</b>	<b>50</b>	<b>-</b>	<b>20</b>

## Qualification Pack

### National Occupational Standards (NOS) Parameters

<b>NOS Code</b>	ICE/CON/N1004
<b>NOS Name</b>	Supervise the Maintenance and Repair of the Plumbing System
<b>Sector</b>	Construction
<b>Sub-Sector</b>	
<b>Occupation</b>	MEP Supervision - Maintenance
<b>NSQF Level</b>	5
<b>Credits</b>	4
<b>Version</b>	1.0
<b>Last Reviewed Date</b>	30/05/2024
<b>Next Review Date</b>	30/05/2027
<b>NSQC Clearance Date</b>	30/05/2024

## Qualification Pack

### ICE/CON/N1003: Apply Computer and IT Skills at Work

#### Description

This unit is about applying computer and Information Technology (IT) skills in work, e.g., using different computer applications

#### Scope

The scope covers the following :

- Use the appropriate operating system
- Use the Internet
- Use Microsoft Word
- Use Microsoft Excel
- Use Microsoft PowerPoint
- Undertake computer networking
- Undertake e-commerce

#### Elements and Performance Criteria

##### *Use the appropriate operating system*

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

- PC1.** use different types of Operating Systems (OS)
- PC2.** compare and select the appropriate type of OS, Network OS and their features
- PC3.** add/remove programs on the computer
- PC4.** access and use - My computer, Display properties, My Documents, and My Network Places on the computer

##### *Use the Internet*

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

- PC5.** follow the appropriate procedure to connect the computer to the Internet
- PC6.** access the Internet on the computer using the appropriate browser and applications
- PC7.** search/surf the Internet, accessing different sites for information and downloading
- PC8.** create a personalized email account using the appropriate email service
- PC9.** use email services to exchange emails with other email users
- PC10.** chat with others through text and voice chat
- PC11.** use official WhatsApp groups and follow chat etiquette
- PC12.** register on different social media platforms and use them to connect with other social media users

##### *Use Microsoft Word*

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

- PC13.** create and save documents in MS Word following the applicable procedure
- PC14.** format the text with different font size and font styles
- PC15.** use different images, symbols etc., to enhance the quality of MS Word content

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- PC16.** set up different page sizes and orientations in MS Word
- PC17.** check spelling and grammar in MS Word to identify and remove grammatical and spelling errors
- PC18.** use Mail Merge to produce multiple letters, labels, envelopes, name tags, etc., using information stored in a list, database, or spreadsheet
- PC19.** create different types of documents using templates in MS Word, e.g. Biodata, letters, project reports, etc.
- PC20.** print MS Word documents with the correct orientation, following the applicable procedure

### *Use Microsoft Excel*

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

- PC21.** create and save worksheets
- PC22.** edit and format worksheets
- PC23.** use formulas and functions, and insert charts and worksheets, as required
- PC24.** use data options in worksheets
- PC25.** create worksheets with images, and numbers and print them with different formatting effects

### *Use Microsoft PowerPoint*

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

- PC26.** create slides of different types, e.g. running presentations
- PC27.** add slide transition effects and animation
- PC28.** run slide shows and make presentations with audio/visual effects
- PC29.** print PPT files maintaining the correct orientation
- PC30.** create PDF format of PPT files
- PC31.** follow the recommended practices concerning PPT presentations, e.g. the dos and don'ts of MS PPT

### *Undertake Computer Networking*

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

- PC32.** determine the functions of different networking components
- PC33.** use different networking components for computer networking
- PC34.** install the network interface card
- PC35.** identify the limitations and merits of different network topologies and use them accordingly

### *Undertake e-commerce*

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

- PC36.** conduct electronic data interchange
- PC37.** follow the appropriate e-commerce safety measures, e.g. the use of encryption to secure payment information to prevent fraud

## Knowledge and Understanding (KU)

The individual on the job needs to know and understand:

- KU1.** the computer system, hardware and software
- KU2.** the operating system, system software and application software

## Qualification Pack

- KU3.** the basic Windows Explorer operations
- KU4.** the basics of MS Word, MS Excel and MS PowerPoint
- KU5.** how to create an email account, draft emails and send email attachments
- KU6.** the formal documentation and email etiquette
- KU7.** the guidelines for chatting for official purposes
- KU8.** how to use the Internet to surf the web
- KU9.** the use of the keyboard, printer, monitor scanner, webcam, microphone, speaker
- KU10.** the sample collection of various types of storage devices, specifications and charts
- KU11.** the basic use of Microsoft (MS) Windows operating system
- KU12.** the development and growth of MS Windows
- KU13.** the features, merits and demerits of MS Windows
- KU14.** the virtual or animated installation of MS Windows
- KU15.** the MS Windows NT features, merits and demerits
- KU16.** the system requirements for various operating systems
- KU17.** Windows default icons and their applications
- KU18.** how to add/remove programs
- KU19.** the use of My Computer, Display properties, My documents, My Network places
- KU20.** the Internet and its applications
- KU21.** how to connect the Ethernet cable and access the Internet
- KU22.** computer networking
- KU23.** the requirements/ applications of networking
- KU24.** the use of different networking components in computer networking
- KU25.** the server/ client concept
- KU26.** the definition and scope of e-commerce
- KU27.** the concept of trade cycle in e-commerce
- KU28.** electronic market as an inter-organizational information system
- KU29.** the computer-to-computer exchange of business documents in a standard electronic format between business partners through Electronic Data Interchange (EDI)
- KU30.** Internet Commerce, Security Issues, Encryption
- KU31.** payment systems and how online payment system works
- KU32.** the limitations of e-Commerce
- KU33.** the trade cycle and electronic markets
- KU34.** the IT ticket logging and handling procedure

## Generic Skills (GS)

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

- GS1.** maintain the appropriate data and records
- GS2.** read the appropriate reports and literature concerning the field of work
- GS3.** communicate professionally with all the stakeholders

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- GS4.** listen attentively to understand the information/ instructions being shared and take appropriate action
- GS5.** coordinate with the co-workers to achieve the work objectives
- GS6.** identify possible disruptions to work and take appropriate mitigation measures
- GS7.** take prompt action to deal with workplace emergencies and accidents
- GS8.** evaluate all possible solutions to work-related problems and select the best one
- GS9.** follow the recommended practices for the timely completion of work and achievement of organizational objectives



## Qualification Pack

### Assessment Criteria

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
<i>Use the appropriate operating system</i>	<b>3</b>	<b>8</b>	-	<b>2</b>
<b>PC1.</b> use different types of Operating Systems (OS)	-	-	-	-
<b>PC2.</b> compare and select the appropriate type of OS, Network OS and their features	-	-	-	-
<b>PC3.</b> add/remove programs on the computer	-	-	-	-
<b>PC4.</b> access and use - My computer, Display properties, My Documents, and My Network Places on the computer	-	-	-	-
<i>Use the Internet</i>	<b>4</b>	<b>11</b>	-	<b>3</b>
<b>PC5.</b> follow the appropriate procedure to connect the computer to the Internet	-	-	-	-
<b>PC6.</b> access the Internet on the computer using the appropriate browser and applications	-	-	-	-
<b>PC7.</b> search/surf the Internet, accessing different sites for information and downloading	-	-	-	-
<b>PC8.</b> create a personalized email account using the appropriate email service	-	-	-	-
<b>PC9.</b> use email services to exchange emails with other email users	-	-	-	-
<b>PC10.</b> chat with others through text and voice chat	-	-	-	-
<b>PC11.</b> use official WhatsApp groups and follow chat etiquette	-	-	-	-
<b>PC12.</b> register on different social media platforms and use them to connect with other social media users	-	-	-	-
<i>Use Microsoft Word</i>	<b>5</b>	<b>8</b>	-	<b>3</b>
<b>PC13.</b> create and save documents in MS Word following the applicable procedure	-	-	-	-

### Qualification Pack

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
<b>PC14.</b> format the text with different font size and font styles	-	-	-	-
<b>PC15.</b> use different images, symbols etc., to enhance the quality of MS Word content	-	-	-	-
<b>PC16.</b> set up different page sizes and orientations in MS Word	-	-	-	-
<b>PC17.</b> check spelling and grammar in MS Word to identify and remove grammatical and spelling errors	-	-	-	-
<b>PC18.</b> use Mail Merge to produce multiple letters, labels, envelopes, name tags, etc., using information stored in a list, database, or spreadsheet	-	-	-	-
<b>PC19.</b> create different types of documents using templates in MS Word, e.g. Biodata, letters, project reports, etc.	-	-	-	-
<b>PC20.</b> print MS Word documents with the correct orientation, following the applicable procedure	-	-	-	-
<i>Use Microsoft Excel</i>	<b>6</b>	<b>7</b>	-	<b>2</b>
<b>PC21.</b> create and save worksheets	-	-	-	-
<b>PC22.</b> edit and format worksheets	-	-	-	-
<b>PC23.</b> use formulas and functions, and insert charts and worksheets, as required	-	-	-	-
<b>PC24.</b> use data options in worksheets	-	-	-	-
<b>PC25.</b> create worksheets with images, and numbers and print them with different formatting effects	-	-	-	-
<i>Use Microsoft PowerPoint</i>	<b>5</b>	<b>6</b>	-	<b>3</b>
<b>PC26.</b> create slides of different types, e.g. running presentations	-	-	-	-
<b>PC27.</b> add slide transition effects and animation	-	-	-	-

### Qualification Pack

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
<b>PC28.</b> run slide shows and make presentations with audio/visual effects	-	-	-	-
<b>PC29.</b> print PPT files maintaining the correct orientation	-	-	-	-
<b>PC30.</b> create PDF format of PPT files	-	-	-	-
<b>PC31.</b> follow the recommended practices concerning PPT presentations, e.g. the dos and don'ts of MS PPT	-	-	-	-
<i>Undertake Computer Networking</i>	<b>4</b>	<b>5</b>	-	<b>4</b>
<b>PC32.</b> determine the functions of different networking components	-	-	-	-
<b>PC33.</b> use different networking components for computer networking	-	-	-	-
<b>PC34.</b> install the network interface card	-	-	-	-
<b>PC35.</b> identify the limitations and merits of different network topologies and use them accordingly	-	-	-	-
<i>Undertake e-commerce</i>	<b>3</b>	<b>5</b>	-	<b>3</b>
<b>PC36.</b> conduct electronic data interchange	-	-	-	-
<b>PC37.</b> follow the appropriate e-commerce safety measures, e.g. the use of encryption to secure payment information to prevent fraud	-	-	-	-
<b>NOS Total</b>	<b>30</b>	<b>50</b>	-	<b>20</b>

## Qualification Pack

### National Occupational Standards (NOS) Parameters

<b>NOS Code</b>	ICE/CON/N1003
<b>NOS Name</b>	Apply Computer and IT Skills at Work
<b>Sector</b>	Construction
<b>Sub-Sector</b>	
<b>Occupation</b>	MEP Supervision - Maintenance
<b>NSQF Level</b>	5
<b>Credits</b>	1
<b>Version</b>	1.0
<b>Last Reviewed Date</b>	30/05/2024
<b>Next Review Date</b>	30/05/2027
<b>NSQC Clearance Date</b>	30/05/2024

## Qualification Pack

### ICE/CON/N1006: Ensure Adherence to Health and Safety Guidelines at Work

#### Description

This unit is about ensuring effective hospitality, health and safety at work

#### Scope

The scope covers the following :

- Ensure effective hospitality
- Ensure health and safety at work

#### Elements and Performance Criteria

##### *Ensure effective hospitality*

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

- PC1.** practice appropriate etiquette and disciplined behaviour at work
- PC2.** use appropriate types of verbal and non-verbal communication at work
- PC3.** maintain professional and positive body language at work, e.g. appropriate eye contact
- PC4.** maintain punctuality at work to ensure the timely completion of tasks
- PC5.** follow the appropriate telephonic etiquette
- PC6.** maintain a welcoming and positive behaviour with customers, avoiding arguments with them

##### *Ensure health and safety at work*

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

- PC7.** identify different types of hazards and risks in the workplace, e.g. risk of slipping on a wet floor, tripping due to unattended objects, falls, fire hazards, etc.
- PC8.** follow the appropriate measures to prevent and control fire hazards, and participate in fire drills to ensure personal preparedness to deal with fire emergencies
- PC9.** check the fire extinguishers for proper functioning and ensure their regular maintenance
- PC10.** use the appropriate Personal Protective Equipment (PPE) to minimize the safety hazards related to the use of equipment
- PC11.** follow the organizational procedure to respond to accidents and emergencies, ensuring immediate first-aid for the affected personnel
- PC12.** maintain and encourage appropriate body posture while lifting, handling and carrying heavy objects to prevent personal injury
- PC13.** maintain and encourage personal hygiene, such as wearing clean clothes and regular hand-washing
- PC14.** use and encourage the use of appropriate Personal Protective Equipment (PPE) to ensure personal protection from harmful chemicals and hazardous substances
- PC15.** ensure the cleanliness of washrooms, including the dryness of the washroom floor to avoid slipping hazard

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- PC16.** implement the appropriate cleaning method, e.g. scrubbing and polishing, for cleaning different types of floors
- PC17.** ensure the safe use of appropriate cleaning agents and equipment as per the manufacturer's instructions
- PC18.** ensure timely first aid is administered to the affected personnel
- PC19.** follow and implement the appropriate procures during health and safety emergencies at work

## Knowledge and Understanding (KU)

The individual on the job needs to know and understand:

- KU1.** different types of health and safety hazards at work sites
- KU2.** the procedure for responding to accidents and other emergencies at the site
- KU3.** use of appropriate Personal Protective Equipment (PPE) based on various working conditions
- KU4.** the handling of relevant tools, equipment, and materials
- KU5.** the effect of construction material on health and environment
- KU6.** various environmental protection methods as per applicability
- KU7.** the storage of waste including non-combustible scrap material and debris, combustible scrap material and debris, general construction waste and trash (non-toxic, non-hazardous), any other hazardous and flammable wastes at the appropriate location
- KU8.** how to handle and use hazardous materials safely
- KU9.** different types of fire
- KU10.** the procedure of operating different types of fire extinguishers
- KU11.** housekeeping activities relevant to the task
- KU12.** different ways of transmission of infection
- KU13.** ways to manage infections at work
- KU14.** different methods of cleaning, disinfection, sterilization, and sanitization
- KU15.** different first aid practices, including Cardiopulmonary Resuscitation (CPR)
- KU16.** the process of conducting safety assessment at work
- KU17.** the appropriate emergency safety procedures, e.g. evacuation during fire
- KU18.** the importance of adhering to work permits
- KU19.** Integrated Management System (IMS) and the quality policy
- KU20.** the quality and Environment, Health & Safety (EHS) objectives
- KU21.** incident reports adherence
- KU22.** the preparations required for internal/ external audits
- KU23.** the work instructions and the control numbers assigned

## Generic Skills (GS)

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

- GS1.** maintain the appropriate data and records

## Qualification Pack

- GS2.** read the appropriate reports and literature concerning the field of work
- GS3.** communicate professionally with all the stakeholders
- GS4.** listen attentively to understand the information/ instructions being shared and take appropriate action
- GS5.** coordinate with the co-workers to achieve the work objectives
- GS6.** identify possible disruptions to work and take appropriate mitigation measures
- GS7.** take prompt action to deal with workplace emergencies and accidents
- GS8.** evaluate all possible solutions to work-related problems and select the best one
- GS9.** follow the recommended practices for the timely completion of work and achievement of organizational objectives

## Qualification Pack

### Assessment Criteria

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
<i>Ensure effective hospitality</i>	<b>14</b>	<b>24</b>	-	<b>12</b>
<b>PC1.</b> practice appropriate etiquette and disciplined behaviour at work	-	-	-	-
<b>PC2.</b> use appropriate types of verbal and non-verbal communication at work	-	-	-	-
<b>PC3.</b> maintain professional and positive body language at work, e.g. appropriate eye contact	-	-	-	-
<b>PC4.</b> maintain punctuality at work to ensure the timely completion of tasks	-	-	-	-
<b>PC5.</b> follow the appropriate telephonic etiquette	-	-	-	-
<b>PC6.</b> maintain a welcoming and positive behaviour with customers, avoiding arguments with them	-	-	-	-
<i>Ensure health and safety at work</i>	<b>16</b>	<b>26</b>	-	<b>8</b>
<b>PC7.</b> identify different types of hazards and risks in the workplace, e.g. risk of slipping on a wet floor, tripping due to unattended objects, falls, fire hazards, etc.	-	-	-	-
<b>PC8.</b> follow the appropriate measures to prevent and control fire hazards, and participate in fire drills to ensure personal preparedness to deal with fire emergencies	-	-	-	-
<b>PC9.</b> check the fire extinguishers for proper functioning and ensure their regular maintenance	-	-	-	-
<b>PC10.</b> use the appropriate Personal Protective Equipment (PPE) to minimize the safety hazards related to the use of equipment	-	-	-	-
<b>PC11.</b> follow the organizational procedure to respond to accidents and emergencies, ensuring immediate first-aid for the affected personnel	-	-	-	-
<b>PC12.</b> maintain and encourage appropriate body posture while lifting, handling and carrying heavy objects to prevent personal injury	-	-	-	-



### Qualification Pack

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
<b>PC13.</b> maintain and encourage personal hygiene, such as wearing clean clothes and regular hand-washing	-	-	-	-
<b>PC14.</b> use and encourage the use of appropriate Personal Protective Equipment (PPE) to ensure personal protection from harmful chemicals and hazardous substances	-	-	-	-
<b>PC15.</b> ensure the cleanliness of washrooms, including the dryness of the washroom floor to avoid slipping hazard	-	-	-	-
<b>PC16.</b> implement the appropriate cleaning method, e.g. scrubbing and polishing, for cleaning different types of floors	-	-	-	-
<b>PC17.</b> ensure the safe use of appropriate cleaning agents and equipment as per the manufacturer's instructions	-	-	-	-
<b>PC18.</b> ensure timely first aid is administered to the affected personnel	-	-	-	-
<b>PC19.</b> follow and implement the appropriate procures during health and safety emergencies at work	-	-	-	-
<b>NOS Total</b>	<b>30</b>	<b>50</b>	<b>-</b>	<b>20</b>

## Qualification Pack

### National Occupational Standards (NOS) Parameters

<b>NOS Code</b>	ICE/CON/N1006
<b>NOS Name</b>	Ensure Adherence to Health and Safety Guidelines at Work
<b>Sector</b>	Construction
<b>Sub-Sector</b>	
<b>Occupation</b>	MEP Supervision - Maintenance
<b>NSQF Level</b>	5
<b>Credits</b>	1
<b>Version</b>	1.0
<b>Last Reviewed Date</b>	30/05/2024
<b>Next Review Date</b>	30/05/2027
<b>NSQC Clearance Date</b>	30/05/2024

## Qualification Pack

### 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:

## Qualification Pack

- 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.

## Qualification Pack

**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



## Qualification Pack

- 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

## Qualification Pack

### 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>	-	-

## Qualification Pack

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	-	-	-	-



### Qualification Pack

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>	-	-

## Qualification Pack

### 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>	07/10/2025
<b>Next Review Date</b>	07/10/2030
<b>NSQC Clearance Date</b>	07/10/2025

## Qualification Pack

### ICE/CON/N1001: Supervise the Use and Control of BMS

#### Description

This unit is about supervising the use and control of the BMS.

#### Scope

The scope covers the following :

- Plan for BMS work
- Monitor and Control the BMS

#### Elements and Performance Criteria

##### *Plan for BMS work*

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

- PC1.** carry out effective planning using the relevant planning software tools, ensuring time bound
- PC2.** scheduling and implementing all critical tasks
- PC3.** assess potential risks that may arise during execution and create effective plans to mitigate
- PC4.** minimizing the impact on project costs and schedules
- PC5.** describe various sensors and transducers - automation components in the BMS
- PC6.** define control panels and communication protocols such as HVAC and Modbus
- PC7.** describe Fire Alarm System (FAS) and Security Systems in Building Automation
- PC8.** install sensors in suitable locations for use in BMS systems
- PC9.** describe controllers use in BMS systems
- PC10.** use programming blocks diagrams to create Direct Digital Control (DDC) configurations

##### *Monitor and Control the BMS*

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

- PC11.** determine the building automation system and its functioning
- PC12.** determine the usage and application of access control systems
- PC13.** supervise the operation and control of the various components, such as the power supply systems, locks, alarms, etc.
- PC14.** use the appropriate software for monitoring the building automation system
- PC15.** diagnose battery problems using a multi-meter, deal with incidents and record them
- PC16.** ensure the use of CCTV systems, fire alarms and firefighting systems as per the standard procedure
- PC17.** identify the types and components of the camera, fire alarm system and its elements and record the analogue and digital footage
- PC18.** check the condition of cables, connectors and batteries in the fire alarm system
- PC19.** check for the correct working of different functions of the fire alarm system such as silence, reset, fire drill, faults, logs, working and types of sprinklers, etc.

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**PC20.** check the time, date, detector sensitivity, firefighting system, alarm sensors, etc., in the fire alarm system

### Knowledge and Understanding (KU)

The individual on the job needs to know and understand:

- KU1.** the importance of Building Maintenance System
- KU2.** different types of facilities
- KU3.** different components of BMS
- KU4.** the engineering and organizational chart
- KU5.** the duties and responsibilities of a BMS Supervisor
- KU6.** the benefits of building automation
- KU7.** the use of hardware and software System Controllers
- KU8.** the importance and applications of sensors and actuators in BIM
- KU9.** the domestic network and device interconnection
- KU10.** how to control lighting, audio, video, acoustics, fire Alarm, firefighting system and CCTV in BIM
- KU11.** fire detection and fighting system maintenance
- KU12.** the water sprinkler system - design of fire hydrant and sprinkler
- KU13.** the maintenance, fault finding and repairs of fire detection, control circuits and sprinkler
- KU14.** the firefighting water force equipment
- KU15.** the maintenance of firefighting pumps
- KU16.** the benefits and functioning of the Access Control System
- KU17.** the handing/ taking over process for the access control system
- KU18.** the installation and maintenance of different types of CCTV systems
- KU19.** the operation of DVR system and its syncing with CCTV
- KU20.** the interior guidelines and enforcement of the same
- KU21.** documentation adherence/ familiarization with IP Multimedia System (IMS)
- KU22.** stores and material management and updation in registers
- KU23.** monitoring of AMCs and the SLA for every AMC
- KU24.** the establish and implement escalation matrix
- KU25.** how to monitor and control the BMS
- KU26.** the use of various hand and power tools
- KU27.** the basics of refrigeration and Heating, Ventilation, and Air Conditioning (HVAC)
- KU28.** different types of HVAC systems
- KU29.** the working cycles of HVAC
- KU30.** the functions of different components of HVAC
- KU31.** the functions of compressor, condenser, evaporator, and refrigerants
- KU32.** the handling and replacement of refrigerant
- KU33.** the inspection and breakdown maintenance of HVAC equipment

## Qualification Pack

- KU34.** the functioning, inspection and breakdown maintenance of AC and DC generators
- KU35.** the working principle of lifts and elevators
- KU36.** the inspection, maintenance and fault finding of lifts and elevators
- KU37.** the monitoring of lift and elevator service report
- KU38.** the use of different measurement equipment for taking different types of measurements
- KU39.** the standards and systems associated with the use and maintenance of hand and power tools and equipment

## Generic Skills (GS)

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

- GS1.** maintain the appropriate data and records
- GS2.** read the appropriate reports and literature concerning the field of work
- GS3.** communicate professionally with all the stakeholders
- GS4.** listen attentively to understand the information/ instructions being shared and take appropriate action
- GS5.** coordinate with the co-workers to achieve the work objectives
- GS6.** identify possible disruptions to work and take appropriate mitigation measures
- GS7.** take prompt action to deal with workplace emergencies and accidents
- GS8.** evaluate all possible solutions to work-related problems and select the best one
- GS9.** follow the recommended practices for the timely completion of work and achievement of organizational objectives

## Qualification Pack

### Assessment Criteria

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
<i>Plan for BMS work</i>	<b>15</b>	<b>30</b>	-	<b>10</b>
<b>PC1.</b> carry out effective planning using the relevant planning software tools, ensuring time bound	-	-	-	-
<b>PC2.</b> scheduling and implementing all critical tasks	-	-	-	-
<b>PC3.</b> assess potential risks that may arise during execution and create effective plans to mitigate	-	-	-	-
<b>PC4.</b> minimizing the impact on project costs and schedules	-	-	-	-
<b>PC5.</b> describe various sensors and transducers - automation components in the BMS	-	-	-	-
<b>PC6.</b> define control panels and communication protocols such as HVAC and Modbus	-	-	-	-
<b>PC7.</b> describe Fire Alarm System (FAS) and Security Systems in Building Automation	-	-	-	-
<b>PC8.</b> install sensors in suitable locations for use in BMS systems	-	-	-	-
<b>PC9.</b> describe controllers use in BMS systems	-	-	-	-
<b>PC10.</b> use programming blocks diagrams to create Direct Digital Control (DDC) configurations	-	-	-	-
<i>Monitor and Control the BMS</i>	<b>15</b>	<b>20</b>	-	<b>10</b>
<b>PC11.</b> determine the building automation system and its functioning	-	-	-	-
<b>PC12.</b> determine the usage and application of access control systems	-	-	-	-
<b>PC13.</b> supervise the operation and control of the various components, such as the power supply systems, locks, alarms, etc.	-	-	-	-
<b>PC14.</b> use the appropriate software for monitoring the building automation system	-	-	-	-

### Qualification Pack

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
<b>PC15.</b> diagnose battery problems using a multi-meter, deal with incidents and record them	-	-	-	-
<b>PC16.</b> ensure the use of CCTV systems, fire alarms and firefighting systems as per the standard procedure	-	-	-	-
<b>PC17.</b> identify the types and components of the camera, fire alarm system and its elements and record the analogue and digital footage	-	-	-	-
<b>PC18.</b> check the condition of cables, connectors and batteries in the fire alarm system	-	-	-	-
<b>PC19.</b> check for the correct working of different functions of the fire alarm system such as silence, reset, fire drill, faults, logs, working and types of sprinklers, etc.	-	-	-	-
<b>PC20.</b> check the time, date, detector sensitivity, firefighting system, alarm sensors, etc., in the fire alarm system	-	-	-	-
<b>NOS Total</b>	<b>30</b>	<b>50</b>	<b>-</b>	<b>20</b>

## Qualification Pack

### National Occupational Standards (NOS) Parameters

<b>NOS Code</b>	ICE/CON/N1001
<b>NOS Name</b>	Supervise the Use and Control of BMS
<b>Sector</b>	Construction
<b>Sub-Sector</b>	
<b>Occupation</b>	MEP Supervision - Maintenance
<b>NSQF Level</b>	5
<b>Credits</b>	3
<b>Version</b>	1.0
<b>Last Reviewed Date</b>	30/05/2024
<b>Next Review Date</b>	30/05/2027
<b>NSQC Clearance Date</b>	30/05/2024

## 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) 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 center (as per assessment criteria below).

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



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5. In case of successfully passing only certain number of NOSs, the trainee is eligible to take subsequent assessment on the balance NOS's to pass the Qualification Pack.

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

### Minimum Aggregate Passing % at QP Level : 70

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

## Assessment Weightage

### Compulsory NOS

National Occupational Standards	Theory Marks	Practical Marks	Project Marks	Viva Marks	Total Marks	Weightage
ICE/CON/N1005.Supervise the Maintenance and Repair of Mechanical Systems	30	50	0	20	100	30
ICE/CON/N1002.Supervise the Electrical Works	30	50	0	20	100	30
ICE/CON/N1004.Supervise the Maintenance and Repair of the Plumbing System	30	50	0	20	100	20
ICE/CON/N1003.Apply Computer and IT Skills at Work	30	50	0	20	100	5
ICE/CON/N1006.Ensure Adherence to Health and Safety Guidelines at Work	30	50	0	20	100	5
DGT/VSQ/N0102.Employability Skills (60 Hours)	20	30	-	-	50	10
<b>Total</b>	<b>170</b>	<b>280</b>	<b>-</b>	<b>100</b>	<b>550</b>	<b>100</b>

Optional: 1 Supervise the use and control of BMS

### Qualification Pack

National Occupational Standards	Theory Marks	Practical Marks	Project Marks	Viva Marks	Total Marks	Weightage
ICE/CON/N1001.Supervise the Use and Control of BMS	30	50	0	20	100	20
<b>Total</b>	<b>30</b>	<b>50</b>	<b>-</b>	<b>20</b>	<b>100</b>	<b>20</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>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>AA</b>	Assessment Agency
<b>AB</b>	Awarding Body
<b>ISCO</b>	International Standard Classification of Occupations
<b>NCO</b>	National Classification of Occupations
<b>NCrF</b>	National Credit Framework
<b>NQR</b>	National Qualification Register
<b>OJT</b>	On the Job Training
<b>EMF</b>	Electromotive force
<b>LV</b>	Low-Voltage
<b>AC</b>	Alternating Current
<b>DC</b>	Direct Current
<b>DB</b>	Distribution Boards
<b>APFC</b>	Automatic Power Factor Control
<b>MCB</b>	Miniature Circuit Breaker
<b>ELCB</b>	Earth Leakage Circuit Breaker
<b>CCTV</b>	Closed-Circuit Television
<b>HVAC</b>	Heating, Ventilation, and Air Conditioning

## Qualification Pack

<b>BMS</b>	Building Management System
<b>BIM</b>	Building Information Modelling
<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>AA</b>	Assessment Agency
<b>AB</b>	Awarding Body
<b>ISCO</b>	International Standard Classification of Occupations
<b>NCO</b>	National Classification of Occupations
<b>NCrF</b>	National Credit Framework
<b>NQR</b>	National Qualification Register
<b>OJT</b>	On the Job Training
<b>EMF</b>	Electromotive force
<b>LV</b>	Low-Voltage
<b>AC</b>	Alternating Current
<b>DC</b>	Direct Current
<b>DB</b>	Distribution Boards
<b>APFC</b>	Automatic Power Factor Control
<b>MCB</b>	Miniature Circuit Breaker
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<b>BMS</b>	Building Management System
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## Qualification Pack

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## Qualification Pack

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<b>AB</b>	Awarding Body
<b>ISCO</b>	International Standard Classification of Occupations
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## Qualification Pack

<b>OJT</b>	On the Job Training
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## Qualification Pack

<b>AC</b>	Alternating Current
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## 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.
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<b>Knowledge and Understanding</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.

## Qualification Pack

<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.
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## Qualification Pack

<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.
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## Qualification Pack

<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.
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<b>National Occupational Standard</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'
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<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.
<b>Knowledge and Understanding</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.



## Qualification Pack

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<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.

## Qualification Pack

<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.
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## Qualification Pack

<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.
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<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 Standard</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.

## Qualification Pack

<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.
<b>Knowledge and Understanding</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</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.