Model Curriculum

1. Construction Electrician-LV

SECTOR: Construction
SUB-SECTOR: Real Estate and Infrastructure Construction
OCCUPATION: Construction Electrical Works
REF ID: CON/Q0603, V1.0
NSQF LEVEL: 4

Skill India
GOVERNMENT OF INDIA
MINISTRY OF SKILL DEVELOPMENT & ENTREPRENEURSHIP
N·S·D·C National Skill Development Corporation
Transforming the skill landscape

Certificate

CURRICULUM COMPLIANCE TO QUALIFICATION PACK – NATIONAL OCCUPATIONAL STANDARDS

is hereby issued by the

CONSTRUCTION SKILL DEVELOPMENT COUNCIL OF INDIA

for the

MODEL CURRICULUM

Complying to National Occupational Standards of
Job Role/ Qualification Pack: **'Construction Electrician-LV'** QP No. **'CON/ Q 0603 NSQF Level 4'**

Date of Issuance: **January 31st, 2017**

Valid up to: **May 23rd, 2017 / Valid up to the next review date of the Qualification Pack**

Authorised Signatory
(Construction Skill Development Council of India)

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Construction Electrician-LV

CURRICULUM / SYLLABUS

This program is aimed at training candidates for the job of a "Construction – Electrician-LV", in the "Construction" Sector/Industry and aims at building the following key competencies amongst the learner

Program Name	**Construction Electrician - LV**		
Qualification Pack Name & Reference ID	CON/Q0603, v1.0		
Version No.	1.0	**Version Update Date**	23-05-2017
Pre-requisites to Training	Preferably 10th Standard with Low Voltage electrical work license from recognized licensing authority with 9 years site experience in same occupation for Trained worker/ 3 years site experience as a certified Assistant Electrician L3 for Non trained worker		
Training Outcomes	**After completing this programme, participants will be able to:** • **Lay (single/ three phase) cable and install equipment at construction sites –** Introduction to standard practices of cable laying at construction sites and • **Inspect and maintain construction equipment as per requirement** – Detailed concept about components of common construction euipments and their electrical maintenance • **Carry out LV electrical wiring and assist in building electrification works** – Concept of domestic wiring and installation of electrical fixtures as part of wiring • **Work effectively in a team to deliver desired results at the workplace**: - Organised working procedure within a team at site • **Plan and organize work to meet expected outcomes :-** Prioritizing activities and organising resources to meet desired outcome • **Work according to personal health, safety and environment protocol at construction site: -** Importance of Health & Safety aspects & measures to be followed while working.		

This course encompasses 6 out of 6 National Occupational Standards (NOS) of "Construction Electrician-LV" Qualification Pack issued by "Construction Skill Development Council of India".

Sr. No.	Module	Key Learning Outcomes	Equipment Required

1	**Introduction**
	
	Theory Duration
	(hh:mm)
	12:00
	Practical Duration
	(hh:mm)
	24:00
		Introduction: -
		• Role description/ functions of the job role
		• Expected personal attributes from the job role
		• Brief description about course content, mode of learning and duration of course
		• Future possible progression and career development provisions on completion of the course
		Theory: -
		• **Ohm's Law** - Simple electrical circuits and problems
		• **Resistors** -Laws of Resistance. Series, parallel and combination circuits
		• **Kirchoff's Laws** and applications. Wheatstone bridge principle and its applications.
		• Effect of variation of temperature on resistance.
		• Different methods of measuring the values of resistance.
		• Types & properties of resistors
		• Specific Resistance
		• **Magnetism** - classification of magnets, methods of magnetising, magnetic materials
		  • Principle of electro-magnetism
		  • Maxwell's corkscrew rule
		  • Fleming's left and right hand rules
		  • Magnetic field of current carrying conductors
		  • loop and solenoid
		  • MMF, Flux density, reluctance
		  • B.H. curve, Hysteresis, Eddy current
		  • Principle of electro-magnetic Induction, Faraday's Law, Lenz's Law.
		• **Electrostatics: Capacitor** - Different types, functions and uses.
		• Types of drills and description of drilling machines,
		proper use, care and maintenance. Description of taps and dies,
		• Use of thread gauge
		
		Demonstration/ Practical (D/P): -
		• Demonstration of Ohm's Law,
			infrastructural requirements
			1. classroom having sitting capacity of 30 trainees
			2. blackboard
			3. LCD monitor 32''
			4. Laptop

Sr. No.	Module	Key Learning Outcomes	Equipment Required
		• Demonstration of Kirchoff's Laws. • Demonstration of laws of series, parallel and combination circuits • Measuring unknown resistance using - a) Using Wheatstone Bridge b) By voltage drop method. • Experiment to demonstrate the variation of resistance of a metal with the change in temperature. • Trace the magnetic field. Assembly / winding of a simple electro magnet. • Identification of different types of Capacitors. • Charging and discharging of capacitor, Testing of Capacitors using DC voltage and lamp.	

2	**Lay (single/ three phase) cable and install equipment at construction sites**
	
	Theory Duration
	(hh:mm)
	48:00
	Practical Duration
	(hh:mm)
	120:00
	
	Corresponding NOS Code
	CON/N0608
		Theory:
		• Introduction to applicable Indian standard code of practice (electrical works)
		• Introduction to wiring symbols used in single and tree phase electrical diagrams
		• Concept regarding correct techniques of interpreting electrical diagrams regarding electrical circuits and manufacturer's instructions
		• Concept of electrical diagram and quantity estimation of required resources from details provided
		• Voltage grading of different types of Insulators, Temp. Rise permissible
		• Applicable safety and environmental norms to LV electrical works at construction sites which include
		  • Safety procedures while laying and joining cables
		  • Safety procedures related to electrical isolation
		  • Safety procedures related to termination of cable
		• Standard method of electrical cable laying at construction site and activity sequences to be followed which includes,
			Hand tools: -
			1. screw drivers
			2. wire cutters
			3. wire strippers
			4. pliers
			5. hammers
			6. hacksaws
			7. chisels
			8. spanners (set)
			9. wrenches
			
			Measuring Instruments
			10. measuring tape
			11. spirit level
			12. plumb-bob
			13. mason's line
			
			Measuring Devices
			14. multi-meter
			15. voltage tester
			
			Power Tools
			16. drilling machine
			17. hand cutting machine
			
			Materials and Fixtures
			18. cables
			19. wires
			20. sockets
			21. switches
			22. lights

Sr. No.	Module	Key Learning Outcomes	Equipment Required
		• Checking and selection of materials, fixtures, tools and equipments to be deployed • Acceptance criteria to be followed while selecting materials, fixtures or tools for cable laying • Method of selecting cable laying path/ inspecting work area (safety and aspects to be considered while laying cable) • Key preparatory works to be completed before commencing laying of cable • Activities involved in cable laying and their sequence • Key organizational procedures to be undergone prior and after cable laying activity such as filling of permits, checklists etc. • Standard method of electrical isolation and its necessity in electrical installation work • Selection and adoption of standard method of termination of cables at power source and equipment power terminals • Selection and use of cable lugs, cable jointers and other electrical accessories used for laying, terminating and joining cables (also include straight through joints) • Required dimensions and safety parameters to be checked for poles or trenches to be used for laying of cable • Type of cables (single/ 3 phase) used as per electrical load • Sequence to be followed while undertaking cable laying work in a construction site • Standard practice of safeguarding installed electrical equipments from external damaging effects • Selection and use of electrical fixtures such as circuit breakers, starters, relays etc. and their power	23. conduits (flexible and rigid) 24. raceways <u>Equipment</u> 25. vibrators 26. bar cutting machine 27. bar bending machine 28. water pumps <u>infrastructural requirements</u> 29. classroom having sitting capacity of 30 trainees 30. blackboard 31. LCD monitor 32'' 32. Laptop

Sr. No.	Module	Key Learning Outcomes	Equipment Required
		rating as per circuit voltage requirement • Selection of method and type of electrical earthing to be adopted for installed electrical equipments • Selection of electrical testing to be undertaken during inspection and trial run of the installed equipment • Selection of electrical testing/ diagnostic devices as per tests to be undertaken • Selection and use of safety gears provided with equipments by manufacturer **Demonstration/ Practical:** • Reading and interpretation of electrical cable laying arrangement • Demonstration and identification of types of cables. • Demonstration and practice on using standard wire gauge & micrometer. • Practice on crimping thimbles, Lugs. • Deciding cable laying method to be adopted and resource required for the activities involved in the same keeping following • Determining quantity and listing of required electrical materials/ consumables for cable laying activity along with their electrical specification • Deciding time requirement for cable laying activity • Describing key safety aspects to be inspected before cable laying • Obtaining required material, tools and electrical fixtures according to the plan of laying • Confirming completion of preparatory works and all relevant safety procedures • Carry out electrical isolation as per laid down working practices • Conducting cable laying as per plan ensuring all quality and safety aspects	

Sr. No.	Module	Key Learning Outcomes	Equipment Required
		• Practice joining of cable by straight through joint using appropriate tools • Connecting electrical equipment by cables and perform termination of cable as per standard practice • Install electrical fixtures and protective devices as per job requirement • Connecting electrical cable to the power source and terminate the cable using appropriate cable termination fixtures • Carrying out trial run of equipment and conduct necessary electrical tests using appropriate testing/ diagnostic devices • Check equipment for installed safety gears and devices and ensure their safe condition and proper functioning	

3	**Inspect and maintain construction equipment as per requirement**
	
	Theory Duration
	(hh:mm)
	56:00
	
	Practical Duration
	(hh:mm)
	128:00
	
	Corresponding NOS Code
	CON/N0609
		Theory:
		• Common construction equipments used in construction sites which includes
		  ○ Pumps
		  ○ Motors
		  ○ Bar Bending machine
		  ○ Bar shearing machine
		  ○ Vibrators
		  ○ Temporary electrical panels
		• Details of power rating of electrical circuits and manufacturers guidelines provided
		• Respective use of such equipments and possible hazards involved in their operations
		• Introduction to key mechanical and electrical components of mentioned equipments
		• Power rating of electrical components and fixtures used in mentioned equipments
		• Concepts of electrical circuits which includes properties and functions of RCL circuits, inductive DC, AC circuits, details of capacitors, inductors and their actions in DC, AC circuits
			Hand tools: -
			1. wall chasing chisel
			2. hammer
			3. hacksaw
			4. file
			5. marking tools
			6. table vice
			7. Stock and die set
			8. Pipe cutter to cut pipes
			9. Hand brooms
			10. Shovels
			11. Screw driver set
			
			Measuring Instruments
			12. measuring tape
			13. spirit level
			14. plumb-bob
			15. mason's line
			
			Power tools
			16. cutting machine
			17. drilling machine
			18. power source

Sr. No.	Module	Key Learning Outcomes	Equipment Required

		• Type of connections and tests to be carried out in capacitive, inductive AC and DC circuits
		• Concept of different types of motors, their uses and working principles
		  • concept of star, delta connection and their uses in electrical circuits
		  • concept and working principle of various type of starters used in DC motors such as 3point, 4 point etc.
		• Concept and working principle of various type of starters used in 3 phase squirrel cage induction motors such as DOL, Star-Delta etc.
		• Working principle of different types 3 phase transformers, connections (star- star, delta-delta, delta-star) and their components
		• Basic concept of application of respective transformers and relevant terminologies like magnetic flux, winding, current and voltage ratio, core and shell construction etc.
		• Different methods of earthing including measurement of earth resistance by earth tester, testing of earth Leakage by ELCB and relay, etc.
		• Use of MCB, RCCB and ELCB in equipment, their working principles and power ratings
		• Procedure of preparing inspection report sheet as per standard procedure
		
		Demonstration/ Practical:
		• Demonstrate electrical circuit diagrams related to electrical equipment
		• Calculate/ interpret electrical power rating of electrical circuits installed in the equipments
		• Demonstrate features of RCL circuits, inductive DC, AC circuits, details of capacitors, inductors and their actions in DC, AC circuits
			Materials
			19. rigid conduits
			20. flexible conduit
			21. clamps for conduits
			22. screws
			
			PPEs & safety equipment's
			23. helmet
			24. safety shoes
			25. safety belt
			26. cotton hand gloves
			27. goggles
			28. Reflective jackets
			29. Safety message boards
			30. Fire extinguishers
			31. Sand buckets
			
			infrastructural requirements
			32. classroom having sitting capacity of 30 trainees
			33. blackboard
			34. LCD monitor 32''
			35. Laptop

Sr. No.	Module	Key Learning Outcomes	Equipment Required
		• Demonstrate functions and features of electrical components of motors • Demonstrate functions and features of electrical components of a transformer • Determining quantity and listing of required electrical materials/ consumables for maintenance along with their electrical specification • Inspecting an equipment of above kind to detect its fault and rectify the same, using necessary diagnostic devices • Install necessary electrical fixtures such as MCBs, switches, wires, sockets, relays etc. of right power rating, using appropriate hand and power tools	
4	**Carry out LV electrical wiring and assist in building electrification works** **Theory Duration** (hh:mm) 56:00 **Practical Duration** (hh:mm) 128:00 **Corresponding NOS Code** CON/N0610	**Theory:** • Guidelines provided in Indian Standard code of practice applicable to electrical wiring works • Statutory guidelines provided by ISI for LV wiring operations • Common electrical wiring Accessories, their specifications in line with NEC – Explanation of switches, lamp holders, plugs and sockets • Concept of drawings, circuit diagrams and/or related schematics for single and three phase LV house wiring system • Method of estimation of required material quantity from electrical drawings • Applicable manufacturer's guidelines/ specifications for use of hand and power tools and measuring devices • Applicable manufacturer's guidelines/ specifications for use of electrical fittings and fixtures • Method of determining use of 3 phases, single phase connections as per electrical drawing, specifications	Hand Tools & materials 1. trowel 2. pointing Trowel 3. Shovel 4. mortar Pan 5. spade 6. pick axe 7. GI bucket 5L capacity 8. wheel Barrow 9. lime powder 10. wooden pegs 11. hammer 12. hard broom 13. source of water 14. ladder Measuring Instruments 15. measuring tape 16. mason's line Equipment 17. hand roller 18. plate vibrator 19. power source

Sr. No.	Module	Key Learning Outcomes	Equipment Required

		• Concept of specification, color coding of cables to be used in wiring system according to load on circuit
		• Concept of properties of different components used in electrical earthing work
		  • Size and shape of battens
		  • Size and shape of raceways
		  • Size of conduits (Flexible/rigid)
		  • Standard practices of cable laying through conduits
		• Concept of different methods of earthing i.e. pipe, plate, etc.
		• Method of measurement of Earth resistance by earth tester
		• Method to test of Earth Leakage by ELCB and relay
		• Concept of area of application & specification of protective devices like fire alarm, MCB, ELCB, MCCB
		• Planning method of lighting arrangement which may enable maximum use of natural lights
		• Idea of current tentative market rate of common electrical items
		• Information about common electrical brands and their products
		• Concept of standard house wiring procedure and best practices
		• Right procedure of handling of electrical fixtures
		• Use of ladders, scaffolds, PPEs, shock resistance gloves during working/ performing tests in a live circuit
		• Use of power drill machine and selection of drill bit for drilling works
		• Use of different common electrical hand and power tools like different pliers, earth tester, tong tester, voltage tester, multimeter, etc.
		• Standard procedure of storing, stacking electrical material, tools and equipment at workplace
		Demonstration/ Practical:
		• Practice cable laying through conduits
			PPEs & safety equipment's
			20. helmet
			21. safety shoes
			22. cotton hand gloves
			23. goggles
			24. Reflective jackets
			25. Safety message boards
			
			infrastructural requirements
			26. classroom having sitting capacity of 30 trainees
			27. blackboard
			28. LCD monitor 32''
			29. laptop

Sr. No.	Module	Key Learning Outcomes	Equipment Required
		• Practice installation of conduits, race ways, switch boards, distribution boards, lights, fans and lighting fixtures • Carry out electrical isolations to the circuit prior to undertake • Carry out inspections on installed electrical circuits to trace out leakage in the circuits, resistance in the circuits, short circuit (if any), • Carry out earthing of the installed electrical circuit as per standard practice	
5	**Work effectively in a team to deliver desired results at the workplace** **Theory Duration** (hh:mm) 08:00 **Practical Duration** (hh:mm) 16:00 **Corresponding NOS Code** CON/N8001	**Theory:-** • Method of oral and written communication skills with co-workers, trade seniors while handling and carrying out visual checks on materials, electrical fixtures, lights, tools and devices • Reading and interpretation of electrical works formats, permits, protocols, checklists • How to interpret scope of electrical activities, material/ tools handling by adhering to instructions or consulting with seniors • Method of providing instruction to subordinates or reporting to seniors clearly and promptly • Seek necessary support and complete assigned tasks within stipulated time duration • Keep good relation and maintain well behavior with co-workers **Demonstration/ Practical (D/P) :-** The skills will be developed and practiced while carrying out following trade related activities in a predictable and familiar working condition 1. Selection of materials, tools or devices for defined purpose under 2. Handling electrical material, fixtures and device 3. Carrying out conduit laying and cable laying 4. Carrying out assembling of temporary panel/ distribution board	infrastructural requirements 1. Classroom having sitting capacity of 30 trainees 2. Blackboard 3. LCD monitor 32'' 4. Laptop

Sr. No.	Module	Key Learning Outcomes	Equipment Required
		5. Undertaking electrical tests by using measuring devices 6. Selection and handing over of desired/ appropriate tools/ materials while assisting trade senior	
6	**Plan and organize work to meet expected outcomes** **Theory Duration** (hh:mm) 08:00 **Practical Duration** (hh:mm) 08:00 **Corresponding NOS Code** CON/N8002	**Theory:-** • To plan electrical activities within defined scope of work • Basic concept of productivity, sequence of working and implementation of safety and organizational norms while working • Upkeep, storing and stacking methods of tools, materials used for domain specific works • Requisition of resources, reporting for requirement of resources orally and in written to concerned authority **Demonstration/ Practical (D/P) :-** The skills will be developed and practiced while carrying out following trade related activities in a predictable and familiar working condition Selection of materials, tools or devices for defined purpose in an optimum manner Handling electrical tools, material, fixtures and device 3. Prioritize all works/ activities 4. Planning conduit laying and cable laying as per scope 5. Carrying out assembling of temporary panel/ distribution board 6. Optimum use of resources while performing task 7. Adherence to stipulated timelines for completion of electrical activities/ tasks	
7	**Work according to personal health, safety and environment protocol at construction site** **Theory Duration** (hh:mm) 08:00 **Practical Duration** (hh:mm) 16:00	**Theory:-** • Types of hazards involved in construction sites • Types of hazards involved in electrical works • Emergency safety control measures and actions to be taken under emergency situation • Concept of :- 1. First Aid process 2. Use of fire extinguisher	PPEs & safety equipment's 1. helmet 2. safety shoes 3. safety belt 4. cotton rubber gloves 5. ear plugs 6. reflective jackets 7. safety message boards

Sr. No.	Module	Key Learning Outcomes	Equipment Required
	Corresponding NOS Code CON/N9001	3. Classification of fires and fire extinguisher 4. Safety drills 5. Types and use of PPEs as per general and electrical safety norms • Reporting procedure to the concerned authority in emergency situations • Standard procedure of handling, storing and stacking material, electrical fixtures and accessories • What is safe disposal of waste, type of waste and their disposal • Type of electrical protective devices, their power ratings and area of application • basic ergonomic principles as per applicability **Demonstration/ Practical (D/P) :-** The skills will be developed and practiced while carrying out following trade related activities in a predictable and familiar working condition. • Selection of PPEs and use them appropriately as per working need of electrical operations, handling, storing, stacking and shifting of electrical fixtures, light units, tools and devices • Selection of PPEs and use them appropriately as per working need of cutting conduit, drilling in walls, termination at the main power source • Analysis of hazards involved to electrical circuits/ connections by external effects and taking necessary steps or informing to seniors • Identification of locations, situations/ circumstances, malpractices which can be hazardous for general or electrical works • Selection of fire extinguisher based on classification of fire, standard practice of storing & stacking fire fighting equipments/ materials at work locations • Disposal of waste materials as per their nature and effects on weather	8. message board displaying Do's and Don'ts at construction sites 9. Fire extinguishers 10. Sand buckets infrastructural requirements 11. Classroom having sitting capacity of 30 trainees 12. Blackboard 13. LCD monitor 32'' 14. Laptop

Sr. No.	Module	Key Learning Outcomes	Equipment Required
	Total Duration **Theory Duration 196:00** **Practical Duration 440:00**	**Unique Equipment Required:** Hand tools: - wall chasing chisel, hammer, hacksaw, file, marking tools , table vice, Stock and die set, Pipe cutter to cut pipes, Hand brooms, Shovels, Screw driver set Measuring Instruments measuring tape, spirit level, plumb-bob , mason's line Power tools cutting machine, drilling machine, power source, Materials rigid conduits, flexible conduit, clamps for conduits, screws PPEs & safety equipment's helmet , safety shoes , safety belt, cotton hand gloves, goggles Reflective jackets, Safety message boards, Fire extinguishers, Sand buckets infrastructural requirements classroom having sitting capacity of 30 trainees, blackboard, LCD monitor 32'', Laptop	

Grand Total Course Duration: 636 **Hours, 0 Minutes**

(This syllabus/ curriculum has been approved by ***Construction Skill Development Council of India)***

Trainer Prerequisites for Job role: "Construction Electrician-LV" mapped to Qualification Pack: "CON/Q0603, v1.0"

Sr. No.	Area	Details
1	**Description**	To deliver accredited training service, mapping to the curriculum detailed above, in accordance with the Qualification Pack "CON/Q0603".
2	**Personal Attributes**	Aptitude for conducting training, and pre/ post work to ensure competent, employable candidates at the end of the training. Strong communication skills, interpersonal skills, ability to work as part of a team; a passion for quality and for developing others; well-organised and focused, eager to learn and keep oneself updated with the latest in the mentioned field
3	**Minimum Educational Qualifications**	ITI/12th standard pass
4a	**Domain Certification**	Trainer/Assessor- 70% in each NOS of Qualification Pack "CON/Q0603" & 80% overall , Lead trainer/Lead Assessors- 70% in each NOS of Qualification Pack "CON/Q0603" & 90% overall
4b	**Platform Certification**	Trainer/Assessor-80% in each NOS of Qualification Pack "MEP/Q0102" or "MEP/Q0104", Lead trainer/ Lead Assessors- 90% in each NOS of Qualification Pack "MEP/Q0101" or "MEP/Q0103"and overall 90%
5	**Experience**	i. Technical Degree holder with minimum three years of Field experience and preferably two years of teaching experience or, ii. In case of a Diploma Holder five years of field experience and preferably two years of teaching experience or, iii. In case of ITI/12th pass minimum eight years of field experience and preferably two years of teaching Experience.

CRITERIA FOR ASSESSMENT OF TRAINEES

Job Role	Construction Electrician - LV
Qualification Pack	CON/Q0603
Sector Skill Council	Construction

Guidelines for Assessment

1. Criteria for assessment for each Qualification Pack will be created by the Sector Skill Council. Each Performance Criteria (PC) will be assigned marks proportional to its importance in NOS. SSC will also lay down proportion of marks for Theory and Skills Practical for each PC.
2. The assessment for the knowledge part will be based on knowledge bank of questions created by Assessment Bodies subject to approval by SSC
3. Individual assessment agencies will create unique question papers for knowledge/theory part for assessment of candidates as per assessment criteria given below
4. Individual assessment agencies will create unique evaluations for skill practical for every student at each examination/training centre based on assessment criteria.
5. The passing percentage for each QP will be 70%. To pass the Qualification Pack, every trainee should score a minimum of 70% individually in each NOS.
6. The Assessor shall check the final outcome of the practices while evaluating the steps performed to achieve the final outcome.
7. The trainee shall be provided with a chance to repeat the test to correct his procedures in case of improper performance, with a deduction of marks for each iteration.
8. After the certain number of iteration as decided by SSC the trainee is marked as fail, scoring zero marks for the procedure for the practical activity.
9. In case of successfully passing only certain number of NOSs, the trainee is eligible to take subsequent assessment on the balance NOSs to pass the Qualification Pack within the specified timeframe set by SSC.
10. Minimum duration of Assessment of each QP shall be of 4hrs/trainee.

				Marks Allocation	
Assessment outcomes	Assessment Criteria for outcomes	**Total Mark**	**Out Of**	**Theory**	**Skills Practical**
CON/N0608: Lay (single/ three phase) cable and install equipment at construction sites	PC1. assist superior in planning (method, material specification, time requirement) of cable laying activity at construction sites	**100**	7	2	5
	PC2. read and interpret electrical drawings, specifications, manufacturer's guidelines as and when required		7	2	5
	PC3. check cables, lights and accessories to be used according to instructions/ drawings/ manufacturer's specifications as per applicability		7	2	5
	PC4. inspect work area for embedded service lines, presence of water table, and vicinity of flammable items prior to cable laying		3	1	2
	PC5. carry out safe isolation at power source as per applicable specification/ electrical safety norms and erect caution signage at appropriate location		10	3	7
	PC6. arrange to execute preparatory activities such as digging of trenches, laying of conduits, erection of poles		7	2	5
	PC7. fill up necessary permits, checklists as per organizational norms prior to undertake above mentioned activities		3	1	2
	PC8. lay cables according to standard practice through trenches, conduits or by means of poles at construction sites		3	1	2
	PC9. check for rigidity of poles, condition of exposed cables and fittings, depth and backfilling of trenches, proper barricading as per safety norms as and when necessary		3	1	2
	PC10. connect cable to power source and electrical equipment/ machinery as per manufacturer's guidelines or standard practice		7	2	5
	PC11. carry out / ensure proper termination of cables as per specification or standard practice		7	2	5
	PC12. install circuit breakers, starters, relays etc. of correct power rating as per specification of the equipment		7	2	5
	PC13. carry out earthing of the equipment (if applicable) by suitable method		7	2	5

	PC14. carry out trial run and perform applicable electrical tests to ensure safe and desired working of construction equipment		3	1	2
	PC15. take preventive measures to secure exposed cables and its accessories against man, vehicular movement or any other external abrasive effects by adopting suitable insulation methods or industry recognized standard practices		3	1	2
	PC16. use and ensure safety tools/ gears (if any) specific to equipment are installed properly as per manufacturer's guidelines		3	1	2
	PC17. ensure upkeep of all electrical tools and equipment under operation according to manufacturer's guidelines or standard procedures		3	1	2
	PC18. ensure proper housekeeping of work area prior/ post working		3	1	2
	PC19. ensure tagging of embedded, exposed electrical lines, its accessories and other equipment		3	1	2
	PC20. work safely according to standard practices, manufacturers guidelines, specifications and electrical safety norms while carrying out cable laying or connecting equipment to the main power source		3	1	2
		Total	**100**	**30**	**70**
CON/ N 0609 : Inspect and maintain construction equipment as per requirement	PC1. carry out appropriate tests and diagnose electrical faults of equipment as and when necessary	**100**	7	2	5
	PC2. power off equipment under maintenance or take necessary precautions as per standard practice while performing tests to live circuits		3	1	2
	PC3. Carry out safe isolation at power source as per applicable specification/ electrical safety norms and erect caution signage at appropriate location		7	2	5
	PC4. repair or replace faulty parts according to the power rating and manufacturer's guideline relevant to circuit under maintenance		7	2	5
	PC5. determine types (DC/AC) motors to be repaired or installed		7	2	5
	PC6. select and use appropriate starters according to the specification and power rating of motors during maintenance		7	2	5

	PC7. carry out winding in armatures of motor if required as per specification of motor		7	2	5
	PC8. inspect and rectify faults detected in earthing of construction equipment referring manufacturer's guidelines		7	2	5
	PC9. replace faulty parts like relays, MCBs, wires, switches, sockets etc. as per maintenance requirement		3	1	2
	PC10. inspect leakage, faults in LV single/ three phase power distribution wirings as per directions, standard practices		7	2	5
	PC11. operate and inspect transformers to detect faults under close supervision		7	2	5
	PC12. carry out maintenance of lighting arrangements installed at critical accessed locations such as tower cranes, high masts etc. and replace faulty parts, consumables as and when necessary		3	1	2
	PC13. join damaged armored cables (bearing heavy electricity loads) using straight through joints efficiently		7	2	5
	PC14. operate changeover switches for switching between main power supply & DGS at required times		3	1	2
	PC15. ensure safe and desired working of temporary electrical panels/ distribution boards at construction sites		3	1	2
	PC16. provide proper notifications to concerned authority prior to undertake maintenance activity following organizational norms		3	1	2
	PC17. work according to electrical safety norms and safety guidelines provided by equipment manufacturer		3	1	2
	PC18. report to senior authority or act efficiently on detection of any unsafe/ hazardous condition		3	1	2
	PC19. document readings, conclusions of tests performed as and when necessary		7	2	5
		Total	**100**	**30**	**70**
CON/ N 0610: Carry out LV electrical wiring and assist in building	PC1. perform visual checks to the house wiring components (such as wires, flexible and rigid conduits, PVC raceways, wooden battens, clamps etc.) prior to using it for concealed wiring purpose in order to ensure their appropriate specification and usability	100	7	2	5

electrification works	PC2. read and interpret single phase wiring diagram and assist in required material calculation		7	2	5
	PC3. carry out necessary measurements of cables/ conduits to meet working needs and in order to carry out marking on wall		3	1	2
	PC4. mark on walls for chasing and monitors wall chasing work to install concealed wiring		7	2	5
	PC5. assist in planning and mark locations of raceways and electrical fixtures/ fittings to be installed on walls		7	2	5
	PC6. lay flexible conduit pipes through RCC structures (slabs, beams, walls) or through chased wall (brick wall) surface as per instruction		7	2	5
	PC7. ensure lock conduit pipe in its location by means of clamp or other standard means		3	1	2
	PC8. place wires through conduits, raceways and ensure specification and number of wires passed through the conduits		7	2	5
	PC9. carry out drilling, cutting works as and when necessary		3	1	2
	PC10. calculate electrical material requirements based on electrical fittings and layouts		7	2	5
	PC11. carry out safe isolation at power source as per applicable specification/ electrical safety norms and erect caution signage at appropriate location		3	1	2
	PC12. install electrical fixtures, fittings (such as DBs, switch boards, switches, sockets, lights and wall brackets) at specified locations and carry out termination of cables as per standard practice		7	2	5
	PC13. perform necessary tests to ensure safe condition of electrical circuit during and post wiring activity using appropriate tools		3	1	2
	PC14. measure earth resistance and leakage as per requirement, using appropriate electrical devices		3	1	2
	PC15. carry out electrical earthing work adopting standard procedure and using appropriate earthing components as per instructions		3	1	2
	PC16. install earthing strips by embedding in concrete, screwing, bolting or by welding in high-rise structures		3	1	2

	PC17. establish new LV connection if required as per circuit load requirement and install household appliances including fan, water pump, refrigerator, fire alarm system, security systems etc.		3	1	2
	PC18. identify and install protective devices of correct power rating, at appropriate locations of wiring		3	1	2
	PC19. adhere to electrical safety norms and act/ report efficiently on detection of any unsafe situation		3	1	2
	PC20. note relevant readings, fill up checklist as per requirement		3	1	2
	PC21. prepare tentative budget for household wiring and electrification work		3	1	2
	PC22. replace faulty electrical fixtures, fittings, LV wiring as and when necessary		3	1	2
		Total	**100**	**30**	**70**
CON/N8001: Work effectively in a team to deliver desired results at the workplace	PC1. pass on work related information/ requirement clearly to the team members	100	7	2	5
	PC2. inform co-workers and superiors about any kind of deviations from work		7	2	5
	PC3. address the problems effectively and report if required to immediate supervisor appropriately		10	3	7
	PC4. receive instructions clearly from superiors and respond effectively on the same		7	2	5
	PC5. communicate to team members/subordinates for appropriate work technique and method		10	3	7
	PC6. seek clarification and advice as per the requirement and applicability		7	2	5
	PC7. hand over the required material, tools tackles, equipment and work fronts timely to interfacing teams		27	8	19
	PC8. work together with co-workers in a synchronized manner		27	8	19
		Total	**100**	**30**	**70**
CON/N8002: Plan and organize work to meet expected outcomes	PC1. understand clearly the targets and timelines set by superiors	**100**	7	2	5
	PC2. plan activities as per schedule and sequence		7	2	5
	PC3. provide guidance to the subordinates to obtain desired outcome		10	3	7
	PC4. plan housekeeping activities prior to and post completion of work		7	2	5

	PC5. list and arrange required resources prior to commencement of work		10	3	7
	PC6. select and employ correct tools, tackles and equipment for completion of desired work		10	3	7
	PC7. complete the work with allocated resources		10	3	7
	PC8. engage allocated manpower in an appropriate manner		10	3	7
	PC9. use resources in an optimum manner to avoid any unnecessary wastage		10	3	7
	PC10. employ tools, tackles and equipment with care to avoid damage to the same		7	2	5
	PC11. organize work output, materials used, tools and tackles deployed,		7	2	5
	PC12. processes adopted to be in line with the specified standards and instructions		7	2	5
		Total	**100**	**30**	**70**
CON/N9001: Work according to personal health, safety and environment protocol at construction site	PC1. identify and report any hazards, risks or breaches in site safety to the appropriate authorities	**100**	7	2	5
	PC2. follow emergency and evacuation procedures in case of accidents, fires, natural calamities		7	2	5
	PC3. follow recommended safe practices in handling construction materials, including chemical and hazardous material whenever applicable		10	3	7
	PC4. participate in safety awareness programs like Tool Box Talks, safety demonstrations, mock drills, conducted at site		7	2	5
	PC5. identify near miss , unsafe condition and unsafe act		7	2	5
	PC6. use appropriate Personal Protective Equipment (PPE) as per work requirements including: • Head Protection (Helmets) • Ear protection • Fall Protection • Foot Protection • Face and Eye Protection, • Hand and Body Protection • Respiratory Protection (if required)		10	3	7
	PC7. handle all required tools, tackles , materials & equipment safely		7	2	5
	PC8. follow safe disposal of waste, harmful and hazardous materials as per EHS guidelines		7	2	5

	PC9. install and apply properly all safety equipment as instructed		13	4	9
	PC10. follow safety protocol and practices as laid down by site EHS department		13	4	9
	PC11. collect and deposit construction waste into identified containers before disposal, separate containers that may be needed for disposal of toxic or hazardous wastes		7	2	5
	PC12. apply ergonomic principles wherever required		7	2	5
		Total	**100**	**30**	**70**