

National Occupational Skill Standard (NOSS)

Occupational Title : Telecom Technician

Level : 2

Sector : Electronics

Sub - Sector : Telecommunication

NOSS ID/NSCO ID :

ISCO NO :



Council for Technical Education and Vocational Training

NATIONAL SKILL TESTING BOARD

Madhyapur Thimi-17, Sanathimi, Bhaktapur, Nepal

Developed: 2019-02-09



2045

DACUM Panel

S.No.	Name	Designation	Organization
1.	Ms. Anju Gautam	Member	Nepal Telecom, Naxal, Kathmandu
2.	Ms. Anjali Shrestha	Member	Nepal Telecom, Indrayani, Kathmandu
3.	Ms. Pramila Niraula (Timsina)	Member	Nepal Telecom, Babarmahal, Kathmandu
4.	Mr. Shalikram Acharya	Member	Nepal Telecom, Sundhara, Kathmandu
5.	Mr. Bharat Gaire	Member	Nepal Telecom, Butwal
6.	Mr. Ashok Hingmang	Member	Nepal Telecom, Birtamode, Jhapa
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2. Mr. Suresh Maharjan, Skill Testing Officer, NSTB, Sanothimi, Bhaktapur

DACUM Workshop on 4 & 5 December 2018



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Customized DACUM Panel

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2.	Ms. Pramila Niraula (Timsina)	Member	Nepal Telecom, Babarmahal, Kathmandu
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DACUM Facilitator/Co-facilitator:

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Customized DACUM Workshop on 27 December 2018



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Recommended by Electronics Technical Sub Committee: 9 February 2019 (26 Magh 2075)



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1	Occupational Title: Telecom Technician Level: 2
2	Job Description: Telecom Technician, L-2 performs field survey, installs, repairs and maintains telecommunication system as per requirement of telecom network.
3	UNITS OF COMPETENCY: 1. Prepare access network plan 2. Install power system 3. Perform transmission work 4. Install copper network 5. Install optical fiber network 6. Perform testing 7. Distribute subscriber line 8. Perform computer work 9. Repair and maintain network 10. Migrate network 11. Perform communication. 12. Develop professionalism. <i>*Note: Units 11 and 12 are not for testing purpose.</i>



4	Qualifying Notes/Prerequisites: - Physical Requirements: Sound health and no colour blindness - Entry Requirements: As per NSTB rules. Additional Information: - Assessment Types: Written and Performance Test. - Assessment Duration: 8 to 12 Hrs - Recommended Group Size: 5 to 7 candidates
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5	Unit No: 1 Unit Title: Prepare access network plan	Unit code:
	Elements of competency	Performance standards
	1.1 Perform aerial and underground field survey	1.1.1 Base map collected. 1.1.2 Existing network plant recorded in base map. 1.1.3 Demand information collected from local bodies. 1.1.4 No of household counted. 1.1.5 Cabinet position, Distribution Point (DP) and pole position marked on base map. 1.1.6 Distance between cabinet to DP and pole to pole measured. 1.1.7 Manhole, Handhole, cabinet base position marked on base map. 1.1.8 Survey report prepared and submitted.
	1.2 Prepare civil network diagram	1.2.1 Manhole position located on base map. 1.2.2 Handhole position located on base map. 1.2.3 Ducting route with distance and number of ducts in the trench identified.
	1.3 Prepare primary network diagram	1.3.1 Physical route diagram prepared with following information: • Cable size and specification • Cable route from MDF to cabinet. • Manhole type • Manhole to Manhole Distance • Handhole to Handhole Distance • Manhole to Handhole Distance 1.3.2 Jointing diagram prepared with following information: • Cable size and specification • Distance between joints and cabinet termination • Joint location with manhole number



	1.4 Prepare secondary network diagram	1.4.1 Polling diagram prepared with following information: • Access device information • Cable specification • Number of cables and types • Pole to pole distance • DP location • Earthing • Stay and push brace 1.4.2 Jointing diagram prepared with following information: • Cable specification • Distance between joints and cabinet termination • Distance between DP to DP
	1.5 Estimate material	1.5.1 List of Items required prepared for civil works. 1.5.2 Material list prepared for primary network. 1.5.3 Material list prepared for secondary network.
6	Task Performance Requirements (Tools, Equipment and Materials): • Base map, pen, pencil, eraser, sharpener, paper, scale, template, measuring wheel, measuring tape, GPS, computer set, printer, calculator and Personal Protective Equipment (PPE).	
7	Safety and Hygiene (Occupational Health and Safety): • Use personal protective equipment. • Safe handling of materials, tools and equipment. • Hazards involved in lifting tools, equipment and materials. • Hazards involved in sharp objects. • Hazards involved due to short circuit and electricity.	



8	Required Knowledge		
	Technical Knowledge	Applied Calculation	Graphical Information
	- Tools and equipment: - Types - Uses - Safe handling - Aerial and underground survey - Maps, Symbols and drawing technique - Base map - Civil network diagram - Primary and secondary network diagram - Jointing diagram - Physical route diagram - Components of telecom network - Digital switching - Transmission - Access network - Occupational health and safety	Perform four basic mathematical calculation	- Read and interpret manual/instructional guide. - Read and interpret drawing/sketch



9	Assessment of Competency					
	Unit: 1					
	Unit Title: Prepare access network plan					
	Candidate Details			Assessors Detail		
	Candidate's Name: Registration Number: Symbol No: Test Centre:			Assessors' Name 1. 2. 3.	ID/License No:	
		Test Date:				
Element of competency	Performance Standards		Standard Met	Standard Not Met	Evidence Type	Comments
1.1 Perform aerial and underground field survey	1.1.1 Base map collected. 1.1.2 Existing network plant recorded in base map. 1.1.3 Demand information collected from local bodies. 1.1.4 No of household counted. 1.1.5 Cabinet position, Distribution Point (DP) and pole position marked on base map. 1.1.6 Distance between cabinet to DP and pole to pole measured. 1.1.7 Manhole, Handhole, cabinet base position marked on base map. 1.1.8 Survey report prepared and submitted.					
1.2 Prepare civil network diagram	1.2.1 Manhole position located on base map. 1.2.2 Handhole position located on base map. 1.2.3 Ducting route with distance and number of ducts in the trench identified.					



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1.3 Prepare primary network diagram	1.3.1 Physical route diagram prepared with following information: • Cable size and specification • Cable route from MDF to cabinet. • Manhole type • Manhole to Manhole Distance • Handhole to Handhole Distance • Manhole to Handhole Distance 1.3.2 Jointing diagram prepared with following information: • Cable size and specification • Distance between joints and cabinet termination • Joint location with manhole number				
1.4 Prepare secondary network diagram	1.4.1 Polling diagram prepared with following information: • Access device information • Cable specification • Number of cables and types • Pole to pole distance • DP location • Earthing • Stay and push brace 1.4.2 Jointing diagram prepared with following information: • Cable specification • Distance between joints and cabinet termination • Distance between DP to DP				
1.5 Estimate material	1.5.1 List of Items required prepared for civil works. 1.5.2 Material list prepared for primary network. 1.5.3 Material list prepared for secondary network.				



WT- Written Test

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Range Statement

Variable	Range
Demand information	<i>May include but not limited to:</i> • Related ward • Plots • Roads
Manhole type	<i>May include but not limited to:</i> • T Type • L Type • S Type
Access device	<i>May include but not limited to:</i> • Cabinet • Multi Service Access Network (MSAN) • Multi Service Access Gateway (MSAG)
Items required	<i>May include but not limited to:</i> • Particular • Specification • Quantity • Cost



Personal Protective Equipment	<i>May include but not limited to:</i> • Helmet • Apron/Protective Jacket • Mask • Goggles • Gloves • Protective shoes • Safety belt • Ear Plug • ESD • Flag • Cone • Ribbon
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5	Unit No: 2 Unit Title: Install power system	Unit code:
	Elements of competency	Performance standards
	2.1 Select power source	2.1.1 Power source identified based on availability and requirement of power.
	2.2 Install rectifier	2.2.1 Rectifier checked for physical damage. 2.2.2 Hole drilled on marked place. 2.2.3 Rectifier mounted on ground/wall with alignment. 2.2.4 Rectifier module inserted on slot. 2.2.5 Power source connected with input terminal and battery cable connected with output terminal. 2.2.6 Battery fuse inserted.
	2.3 Install battery bank	2.3.1 Battery checked for physical damage. 2.3.2 Battery capacity checked. 2.3.3 Battery voltage and discharge current checked. 2.3.4 Battery rack fixed. 2.3.5 Battery placed into rack. 2.3.6 Battery connector cable prepared. 2.3.7 Battery connected in series/parallel connection. 2.3.8 Battery connected with rectifier.
	2.4 Install power distribution frame	2.4.1 Hole drilled on marked place. 2.4.2 Power distribution frame (PDF) mounted and tightly fixed on wall with alignment. 2.4.3 Power supply connected. 2.4.4 Load connected.
	2.5 Perform earthing	2.5.1 Earthing materials collected. 2.5.2 Earthing plate and strip placed into pit of minimum 2m depth. 2.5.3 A mixture of soil, charcoal and salt placed over earthing plate. 2.5.4 Earthing bus bar connected with earthing strip.



		2.5.5 Earthing resistance tested.
		2.5.6 Earthing connected with equipment.
	2.6 Test power supply	2.6.1 Phase to phase voltage checked. 2.6.2 Phase to neutral voltage checked. 2.6.3 Positive to negative voltage checked. 2.6.4 Load current checked.
6	Task Performance Requirements (Tools, Equipment and Materials): Battery, Charge Controller, Inverter, Solar Panel (module/Array), Generator, Measuring tape, Hammer, Cable cutter, Knife, Crimping tool set, Nose plier, Plier, Side cutter, Screw driver, Hacksaw, Compass, GPS, Multimeter, Megger, Clamp meter (tongue tester), C-meter, Ohm meter, Ammeter, Adjustable wrench, Suspension wire cutter, Power meter box, MCB/MCCB, Power Socket, Eye glass, rope, Fuse, Switch, Cable Shoe, Power cable, Power Distribution Frame, Rectifier, Gas torch, Level meter, LPG Gas, Soldering iron, Phase tester, Earthing Rod, GI pipe, Earthing wire, Earthing plate, Earth meter, Coal, Salt, Joint piece, Joint sleeve, Cloth, Kerosene, Spiral pipe, Nut Bolts and PPE.	
7	Safety and Hygiene (Occupational Health and Safety): - Use personal protective equipment. - Safe handling of materials, tools and equipment. - Hazards involved in lifting tools, equipment and materials. - Hazards involved in sharp objects. - Hazards involved due to short circuit and electricity. - Hazards involved due to battery.	



8	Required Knowledge		
	Technical Knowledge	Applied Calculation	Graphical Information
	- Tools and equipment: - Types - Uses - Safe handling - Fundamentals of electrical and electronics - AC/DC supply - Generator and Rectifier - Solar PV system (Efficiency of Mono crystalline, Poly crystalline and Thin film, solar mapping, solar insolation) - Batteries (Types, capacity, specific gravity, State of Charge (SOC), Depth of discharge (DOD), life cycle and environmental impact) - Invertor - Transformer - Air conditioning (Capacity) - Combination of batteries and cells (Parallel and series) - Wind turbine (Wind mapping, Horizontal and vertical axis) - Lightning and protection - Protective equipment (Fuse, MCB, MCCB)	Perform four basic mathematical calculation	- Read and interpret manual/instructional guide. - Read and interpret circuit diagram. - Read and interpret drawing/sketch.



9	Assessment of Competency						
	Unit: 2 Unit Title: Install power system						
	Candidate Details			Assessors Detail			
	Candidate's Name: Registration Number: Symbol No: Test Centre:			Assessors' Name 1. 2. 3.		ID/License No:	
Element of competency		Performance Standards		Standard Met	Standard Not Met	Evidence Type	Comments
2.1 Select power source		2.1.2 Power source identified based on availability and requirement of power.					
2.2 Install rectifier		2.2.1 Rectifier checked for physical damage. 2.2.2 Hole drilled on marked place. 2.2.3 Rectifier mounted on ground/wall with alignment. 2.2.4 Rectifier module inserted on slot. 2.2.5 Power source connected with input terminal and battery cable connected with output terminal. 2.2.6 Battery fuse inserted.					
2.3 Install battery bank		2.3.1 Battery checked for physical damage. 2.3.2 Battery capacity checked. 2.3.3 Battery voltage and discharge current checked. 2.3.4 Battery rack fixed. 2.3.5 Battery placed into rack. 2.3.6 Battery connector cable prepared. 2.3.7 Battery connected in series/parallel connection.					



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	2.3.8 Battery connected with rectifier.				
2.4 Install power distribution frame	2.4.1 Hole drilled on marked place. 2.4.2 Power distribution frame (PDF) mounted and tightly fixed on wall with alignment. 2.4.3 Power supply connected. 2.4.4 Load connected.				
2.5 Perform earthing	2.5.1 Earthing materials collected. 2.5.2 Earthing plate and strip placed into pit of minimum 2m depth. 2.5.3 A mixture of soil, charcoal and salt placed over earthing plate. 2.5.4 Earthing bus bar connected with earthing strip. 2.5.5 Earthing resistance tested. 2.5.6 Earthing connected with equipment.				
2.6 Test power supply	2.6.1 Phase to phase voltage checked. 2.6.2 Phase to neutral voltage checked. 2.6.3 Positive to negative voltage checked. 2.6.4 Load current checked.				

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Range Statement

Variable	Range
Power source	<i>May include but not limited to:</i> • AC • DC • Solar Photovoltaic



5	Unit No: 3 Unit Title: Perform transmission work	Unit code:
	Elements of competency	Performance standards
	3.1 Perform transmission survey	3.1.1 Longitude, latitude and altitude data collected. 3.1.2 Distance between existing node and planned location recorded. 3.1.3 Location and stake holder information collected. 3.1.4 Line of sight tested from planned area/location. 3.1.5 Transmission media identified.
	3.2 Install optical fiber network	3.2.1 Optical distribution frame assembled and tightly fixed on marked place. 3.2.2 Underground/feeder cable pulled through subduct and sealed. 3.2.3 Fiber distribution cabinet/curb tightly fixed with proper alignment. 3.2.4 Pole erected and pole accessories tightly fixed on pole. 3.2.5 Aerial optical cable pulled maintaining sag, ground and electrical clearance. 3.2.6 Cable patched, spliced and terminated. 3.2.7 Fiber access point firmly fixed on marked position. 3.2.8 Label and number assigned to port, FAP, Duct and cable. 3.2.9 Modification updated in given drawing.
	3.3 Install radio link	3.3.1 Position of radio equipment located and marked. 3.3.2 Hole drilled on marked place. 3.3.3 Radio equipment mounted and tightly fixed. 3.3.4 Radio antenna assembled. 3.3.5 Radio antenna mounted and alignment adjusted. 3.3.6 Power and data cable/wires connected. 3.3.7 Earthing connected to equipment. 3.3.8 Labelling performed. 3.3.9 Radio link tested.
	3.4 Install VSAT link	3.4.1 Position of VSAT equipment located and marked. 3.4.2 Hole drilled on marked place. 3.4.3 VSAT equipment mounted and tightly fixed. 3.4.4 VSAT antenna assembled. 3.4.5 VSAT antenna mounted and alignment adjusted.



		3.4.6 Power and data cable/wires connected. 3.4.7 Earthing connected to equipment. 3.4.8 Labelling performed. 3.4.9 VSAT link tested.
6	Task Performance Requirements (Tools, Equipment and Materials): Measuring wheel, Measuring tape, Rope, Hammer, Cable cutter, Knife, Crimping tool, Nose plier, Plier, Side cutter, Screw driver, Hacksaw, Fiber splicing machine, Fiber stripper, Fiber cleaver, Optical source, Optical power meter, GPS, Multimeter, Megger, VFL tester, OTDR (Optical Time Domain Reflectometer), Power meter, Fiber cutter, RJ-45 clammer, Tube cutter, Lap cutter, Adjustable wrench, Power cable, VSAT Antenna, Radio Antenna, Coaxial Cable, Radio Equipment, Optical Fiber, Labelling tag and PPE.	
7	Safety and Hygiene (Occupational Health and Safety): - Use personal protective equipment. - Safe handling of materials, tools and equipment. - Hazards involved in lifting tools, equipment and materials. - Hazards involved in sharp objects. - Hazards involved due to short circuit and electricity.	



8	Required Knowledge		
	Technical Knowledge	Applied Calculation	Graphical Information
	- Tools and equipment: - Types - Uses - Safe handling - Fundamentals of transmission - Transmission mode and medium - IP concept of transmission network - Features and services of Optical Fiber, All Dielectric Self-Supporting cable (ADSS) and Optical Power Ground Wire (OPGW) - Features and services of Very Small Aperture Terminal (VSAT) and micro wave radio transmission		- Read and interpret manual/instructional guide. - Read and interpret circuit diagram. - Read and interpret drawing/sketch



9	Assessment of Competency						
	Unit: 3 Unit Title: Perform transmission work						
	Candidate Details			Assessors Detail			
	Candidate's Name: Registration Number: Symbol No: Test Centre:			Assessors' Name 1. 2. 3.		ID/License No:	
Element of competency		Performance Standards		Standard Met	Standard Not Met	Evidence Type	Comments
3.1 Perform transmission survey		3.1.1 Longitude, latitude and altitude data collected. 3.1.2 Distance between existing node and planed location recorded. 3.1.3 Location and stake holder information collected. 3.1.4 Line of sight tested from planned area/location. 3.1.5 Transmission media identified.					
3.2 Install optical fiber network		3.2.1 Optical distribution frame assembled and tightly fixed on marked place. 3.2.2 Underground/feeder cable pulled through subduct and sealed. 3.2.3 Fiber distribution cabinet/curb tightly fixed with proper alignment. 3.2.4 Pole erected and pole accessories tightly fixed on pole. 3.2.5 Aerial optical cable pulled maintaining sag, ground and electrical clearance. 3.2.6 Cable patched, spliced and terminated. 3.2.7 Fiber access point firmly fixed on marked position.					



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	3.2.8 Label and number assigned to port, FAP, Duct and cable. 3.2.9 Modification updated in given drawing.				
3.3 Install radio link	3.3.1 Position of radio equipment located and marked. 3.3.2 Hole drilled on marked place. 3.3.3 Radio equipment mounted and tightly fixed. 3.3.4 Radio antenna assembled. 3.3.5 Radio antenna mounted and alignment adjusted. 3.3.6 Power and data cable/wires connected. 3.3.7 Earthing connected to equipment. 3.3.8 Labelling performed. 3.3.9 Radio link tested.				
3.4 Install VSAT link	3.4.1 Position of VSAT equipment located and marked. 3.4.2 Hole drilled on marked place. 3.4.3 VSAT equipment mounted and tightly fixed. 3.4.4 VSAT antenna assembled. 3.4.5 VSAT antenna mounted and alignment adjusted. 3.4.6 Power and data cable/wires connected. 3.4.7 Earthing connected to equipment. 3.4.8 Labelling performed. 3.4.9 VSAT link tested.				

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5	Unit No: 4 Unit Title: Install copper network	Unit code:
	Elements of competency	Performance standards
	4.1 Install Main Distribution Frame	4.1.1 Hole drilled on marked place. 4.1.2 Main distribution Frame (MDF) assembled. 4.1.3 MDF mounted on drilled place with alignment. 4.1.4 Number side (E side) and Primary Side (D side) fit on MDF.
	4.2 Pull underground cable	4.2.1 Duct checked for damage and breakage. 4.2.2 Duct inner surface cleared. 4.2.3 Nylon rope inserted through duct. 4.2.4 Steel rope tied with nylon rope and pulled through another manhole. 4.2.5 Cable grip fitted to primary cable. 4.2.6 Underground cable pulled through another manhole. 4.2.7 Cable loop not less than 4 meters prepared at end of underground cable and sealed.
	4.3 Install cabinet	4.3.1 Hole drilled on cabinet base. 4.3.2 Expansion bolt fitted. 4.3.3 Cabinet mounted on cabinet base. 4.3.4 Cabinet fixed with proper alignment. 4.3.5 Rod earthing connected to cabinet.
	4.4 Erect pole	4.4.1 Pole location marked as per secondary network polling diagram. 4.4.2 Hole dug to 1/6 of the pole length. 4.4.3 Pole placed safely in hole. 4.4.4 Pole alignment checked and fixed.
	4.5 Fit pole accessories	4.5.1 Position of pole accessories marked clearly on pole. 4.5.2 Pole accessories tightly fitted on marked position with eriband.
	4.6 Pull aerial cable	4.6.1 Cable laid safely on ground. 4.6.2 Cable raised to cable roller fixed on pole. 4.6.3 Messenger wire of cable fixed on starting pole. 4.6.4 Aerial cable pulled maintaining sag, ground clearance and electrical clearance.
	4.7 Perform cable termination	4.7.1 Primary cable entered through left side of cabinet. 4.7.2 Secondary cable entered through right side of cabinet.



		4.7.3 Tag frame fixed into cabinet. 4.7.4 Cable prepared for termination. 4.7.5 Primary cable terminated into primary tag sequentially. 4.7.6 Secondary cable terminated into secondary tag sequentially.
4.8	Fit Distribution point	4.8.1 Distribution point (DP) position marked as per secondary network polling diagram. 4.8.2 DP fixed firmly on pole 100cm from the top of pole.
4.9	Perform aerial cable splicing and enclosing	4.9.1 43cm sheath opened for more than 50 pairs cable. 4.9.2 Enclosure end cap inserted into cable. 4.9.3 Cable lacing performed for unit binder and group binder. 4.9.4 Cable jointed with 4 twist and 4cm opening. 4.9.5 5 banks prepared at every interval of 6 cm starting from 9.5 cm for more than 50 pairs cable. 4.9.6 Two ends of cable connected with sheath continuity wire. 4.9.7 Enclosure fitted on joint.
4.10	Perform underground cable splicing and enclosing	4.10.1 48cm sheath opened for more than 300 pairs cable. 4.10.2 Cable lacing performed for unit binder and group binder. 4.10.3 cable Jointed in 2 banks with 25 pair modular connector. 4.10.4 Two ends of cable connected with sheath continuity wire. 4.10.5 Metal canister of closure fitted. 4.10.6 Aluminum tape applied on both side cables away from canister. 4.10.7 Heat shrink enclosure sleeve wrapped around metal canister. 4.10.8 Heat shrink enclosure closed with gas torch till green color spot completely changed to black.
4.11	Perform labelling and numbering	4.11.1 MDF port number assigned port-wise/block-wise in sequential order. 4.11.2 Number assigned to primary cable. 4.11.3 Primary and secondary pair labelled in cabinet. 4.11.4 Number assigned to DP (cabinet number /DP number). 4.11.5 Technician name and date mentioned in underground cable joint.
4.12	Prepare as built drawing	4.12.1 Modification updated in given drawing.



6	Task Performance Requirements (Tools, Equipment and Materials): Measuring wheel, Measuring tape, Digger, Shovel, Spade, Pick axe, Long handle scoop, Digging bar, Nylon Rope, Hammer, Tamping tool, Insertion tool, Simera (vice), Roller, Cable cutter, Knife, Web cutter, Crimping tool, Nose plier, Plier, Side cutter, Screw driver, Hacksaw, Mono Phone, Winch machine, Blower, Fix rod and brush, Cable grip, UG cable splicing machine, Cable fault localizer, Pole, Eriband (Steel band), Eriband seal, Stay wire, Stay rod, Anchoring eye, Pin type bracket, suspension clamp, Gas and gas torch, Eye glasses, Ventilator, Compass, GPS, Earth meter, Multimeter, Megger, clamp meter, C-meter, Ohm meter, ammeter, Sheath cutter, Lap cutter, Adjustable wrench, Suspension wire cutter, Metal detector, Tone tester/probe, slitter, Vertical and Horizontal sheath cutter, Distribution bracket, Bridle Ring, Distribution point (DP), Copper cable, UY2 connector, MDF Rack, Cabinet box, Tag (Krone/pouyet), Closure (Aerial/UG), Modular connector (UG), U-knot, Power meter and PPE.
7	Safety and Hygiene (Occupational Health and Safety): - Use personal protective equipment. - Safe handling of materials, tools and equipment. - Hazards involved in lifting tools, equipment and materials. - Hazards involved in sharp objects. - Hazards involved due to short circuit and electricity. - Hazards involved in underground network.



8	Required Knowledge		
	Technical Knowledge	Applied Calculation	Graphical Information
	- Tools and equipment: - Types - Uses - Safe handling - Outside plant - Cable types and specification - Colour code - Splicing and enclosing procedure - Manhole and Hand hole - Cable vault - MDF - Ducting - Cabinet - DP - Pole erection and accessories fitting procedure - Subscriber line installation process - Stay types - Push brace - Base concrete - UG cable - Termination process - Tag types - Insulation Displacement Connection (IDC)		- Read and interpret manual/instructional guide. - Read and interpret circuit diagram. - Read and interpret drawing/sketch.



9	Assessment of Competency						
	Unit: 4						
	Unit Title: Install copper network						
	Candidate Details			Assessors Detail			
	Candidate's Name: Registration Number: Symbol No: Test Centre:			Assessors' Name 1. 2. 3.		ID/License No:	
Element of competency		Performance Standards		Standard Met	Standard Not Met	Evidence Type	Comments
4.1 Install Main Distribution Frame		4.1.1 Hole drilled on marked place. 4.1.2 Main distribution Frame (MDF) assembled. 4.1.3 MDF mounted on drilled place with alignment. 4.1.4 Number side (E side) and Primary Side (D side) fit on MDF.					
4.2 Pull underground cable		4.2.1 Duct checked for damage and breakage. 4.2.2 Duct inner surface cleared. 4.2.3 Nylon rope inserted through duct. 4.2.4 Steel rope tied with nylon rope and pulled through another manhole. 4.2.5 Cable grip fitted to primary cable. 4.2.6 Underground cable pulled through another manhole. 4.2.7 Cable loop not less than 4 meters prepared at end of underground cable and sealed.					
4.3 Install cabinet		4.3.1 Hole drilled on cabinet base. 4.3.2 Expansion bolt fitted. 4.3.3 Cabinet mounted on cabinet base.					



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	4.3.4 Cabinet fixed with proper alignment. 4.3.5 Rod earthing connected to cabinet.				
4.4 Erect pole	4.4.1 Pole location marked as per secondary network polling diagram. 4.4.2 Hole dug to 1/6 of the pole length. 4.4.3 Pole placed safely in hole. 4.4.4 Pole alignment checked and fixed.				
4.5 Fit pole accessories	4.5.1 Position of pole accessories marked clearly on pole. 4.5.2 Pole accessories tightly fitted on marked position with eriband.				
4.6 Pull aerial cable	4.6.1 Cable laid safely on ground. 4.6.2 Cable raised to cable roller fixed on pole. 4.6.3 Messenger wire of cable fixed on starting pole. 4.6.4 Aerial cable pulled maintaining sag, ground clearance and electrical clearance.				
4.7 Perform cable termination	4.7.1 Primary cable entered through left side of cabinet. 4.7.2 Secondary cable entered through right side of cabinet. 4.7.3 Tag frame fixed into cabinet. 4.7.4 Cable prepared for termination. 4.7.5 Primary cable terminated into primary tag sequentially. 4.7.6 Secondary cable terminated into secondary tag sequentially.				
4.8 Fit Distribution point	4.8.1 Distribution point (DP) position marked as per secondary network polling diagram. 4.8.2 DP fixed firmly on pole 100cm from the top of pole.				
4.9 Perform aerial cable splicing and enclosing	4.9.1 43cm sheath opened for more than 50 pairs cable. 4.9.2 Enclosure end cap inserted into cable. 4.9.3 Cable lacing performed for unit binder and group binder. 4.9.4 Cable jointed with 4 twist and 4cm opening.				



	4.9.5 5 banks prepared at every interval of 6 cm starting from 9.5 cm for more than 50 pairs cable. 4.9.6 Two ends of cable connected with sheath continuity wire. 4.9.7 Enclosure fitted on joint.				
4.10 Perform underground cable splicing and enclosing	4.10.1 48cm sheath opened for more than 300 pairs cable. 4.10.2 Cable lacing performed for unit binder and group binder. 4.10.3 cable Jointed in 2 banks with 25 pair modular connector. 4.10.4 Two ends of cable connected with sheath continuity wire. 4.10.5 Metal canister of closure fitted. 4.10.6 Aluminum tape applied on both side cables away from canister. 4.10.7 Heat shrink enclosure sleeve wrapped around metal canister. 4.10.8 Heat shrink enclosure closed with gas torch till green color spot completely changed to black.				
4.11 Perform labelling and numbering	4.11.1 MDF port number assigned port-wise/block-wise in sequential order. 4.11.2 Number assigned to primary cable. 4.11.3 Primary and secondary pair labelled in cabinet. 4.11.4 Number assigned to DP (cabinet number /DP number). 4.11.5 Technician name and date mentioned in underground cable joint.				
4.12 Prepare as built drawing	4.12.1 Modification updated in given drawing.				

WT- Written Test

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Range Statement

Variable	Range
Position of pole accessories	<i>May include but not limited to:</i> • Distribution bracket: 20 cm from top of the pole • Stay seat: 40 cm from top of the pole • Pin type bracket: 50 cm from top of the pole • Anchoring eye: 50 cm from top of the pole • Suspension clamp: 50 cm from top of the pole • Bridle ring: 80 to 110 cm from top of the pole
Pole accessories	<i>May include but not limited to:</i> • Distribution bracket • Stay seat • Pin type bracket • Anchoring eye • Suspension clamp • Bridle ring



5	Unit No: 5 Unit Title: Install optical fiber network	Unit code:
	Elements of competency	Performance standards
	5.1 Install optical distribution Frame	5.1.1 Hole drilled on marked place. 5.1.2 Optical Distribution Frame (ODF) assembled. 5.1.3 ODF mounted and tightly fixed with alignment.
	5.2 Pull underground/feeder cable	5.2.1 Duct checked for damage and breakage. 5.2.2 Duct inner surface cleared. 5.2.3 Nylon rope inserted through duct. 5.2.4 Steel rope tied with nylon rope and pulled through another manhole. 5.2.5 Cable grip fitted to sub duct. 5.2.6 Sub duct pulled through another manhole. 5.2.7 Optical cable passed through sub duct. 5.2.8 Spare sub duct sealed. 5.2.9 Cable loop of 5-25 meters prepared at end of underground cable and sealed.
	5.3 Install fiber distribution cabinet/curb	5.3.1 Hole drilled on cabinet base. 5.3.2 Expansion bolt fitted. 5.3.3 Fiber distribution curb (FDC) mounted on cabinet base. 5.3.4 FDC tightly fixed with proper alignment. 5.3.5 Earthing connected to FDC.
	5.4 Perform fiber patching	5.4.1 Patch cable selected. 5.4.2 Ports identified. 5.4.3 Patch cord inserted into ports.
	5.5 Erect pole	5.5.1 Pole location marked as per secondary network polling diagram. 5.5.2 Hole dug to 1/6 of the pole length. 5.5.3 Pole placed safely in hole. 5.5.4 Pole alignment checked and fixed.
	5.6 Fit pole accessories	5.6.1 Position of pole accessories marked clearly on pole. 5.6.2 Pole accessories tightly fitted with eriband.
	5.7 Pull aerial optical cable	5.7.1 Aerial optical cable laid safely on ground. 5.7.2 Aerial optical cable raised to cable roller fixed on pole.



		5.7.3 Messenger wire of cable fixed on starting pole. 5.7.4 Aerial optical cable pulled maintaining sag, ground and electrical clearance.
	5.8 Perform cable termination	5.8.1 Feeder cable entered through left side of cabinet. 5.8.2 Distribution cable entered through right side of cabinet. 5.8.3 Cable prepared for splicing. 5.8.4 Each fiber spliced with pig tail. 5.8.5 Joint placed on tray and pig tail fixed on port.
	5.9 Perform splicing and enclosing	5.9.1 Optical cable fitted on optical fiber enclosure. 5.9.2 120-150 cm sheath opened each side of cable. 5.9.3 Tube removed. 5.9.4 Protection sleeve inserted. 5.9.5 Fiber core cleaned and fusion. 5.9.6 Loss measured from 0 to 0.02 dB. 5.9.7 Protection sleeve heated. 5.9.8 Protection sleeve inserted into groove. 5.9.9 Fiber placed into enclosure tray with a figure of eight. 5.9.10 Enclosure tightly closed.
	5.10 Fit Fiber Access Point	5.10.1 Fiber Access Point (FAP) position marked as per distribution network polling diagram. 5.10.2 FAP fixed firmly.
	5.11 Perform labelling and numbering	5.11.1 Number assigned to port of ODF block-wise in sequential order. 5.11.2 Number assigned to feeder and distribution port at FDC. 5.11.3 Number assigned to FAP. 5.11.4 Subduct and feeder cable numbered.
	5.12 Prepare as built drawing	5.12.1 Modification updated in given drawing.

6

Task Performance Requirements (Tools, Equipment and Materials):

- Measuring wheel, Measuring tape, Digger, Shovel, Spade, Pick axe, Long handle scoop, Digging bar, Rope, Hammer, Tamping tool, Simera (vice), Roller, Cable cutter, Knife, Web cutter, Crimping tool, Nose plier, Plier, Side cutter, Screw driver, Hacksaw, Winch machine, Mono phone, Blower, Fix rod and brush, Cable grip, Fiber splicing machine, Fiber stripper, Fiber clever, Cable fault localizer, Source power meter, Pole, Eriband (Steel band), RJ-45 clammer, Eriband seal, Stay wire, Stay rod, Anchoring eye, Pin type bracket, suspension clamp, LPG gas and



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	gas torch, Eye glasses, Ventilator, GPS, VFL tester, Multimeter, Megger, OTDR (Optical Time Domain Reflectometer), Power meter, Sheath cutter, Fiber cutter, Tube cutter, Lap cutter, Adjustable wrench, Suspension wire cutter, Metal detector, Tone probe, Laser source, Fiber Stripper, Slitter, Round cutter, Vertical and Horizontal sheath cutter, Fiber cleaner, Distribution bracket, Bridle Ring, FAP, Optical Fiber Cable, Patch Fiber Cable, ODF box, Protective Sleeve, Closure (Aerial/UG), U-knot, Power meter and PPE.
7	Safety and Hygiene (Occupational Health and Safety): • Use personal protective equipment. • Safe handling of materials, tools and equipment. • Hazards involved in lifting tools, equipment and materials. • Hazards involved in sharp objects. • Hazards involved due to short circuit and electricity. • Hazards involved due to optical fiber.



8	Required Knowledge		
	Technical Knowledge	Applied Calculation	Graphical Information
	- Tools and equipment: - Types - Uses - Safe handling - Basic optics - Optical fiber cable and standards - Colour codes - Types of connector - Splicing technique - Optical fiber testing procedure - Function of splitter - Optical Line Terminal (OLT), Optical Distribution Frame (ODF), Fiber Distribution Cabinet/Curb (FDC), Fiber Access Point (FAP), drop fiber upto Customer Premises Equipment (CPE) - Fiber to the home (FTTH) network - Lease line		- Read and interpret manual/instructional guide. - Read and interpret circuit diagram. - Read and interpret drawing/sketch.



9	Assessment of Competency						
	Unit: 5						
	Unit Title: Install optical fiber network						
	Candidate Details			Assessors Detail			
	Candidate's Name: Registration Number: Symbol No: Test Centre:			Assessors' Name 1. 2. 3.		ID/License No:	
Element of competency		Performance Standards		Standard Met	Standard Not Met	Evidence Type	Comments
5.1 Install optical distribution Frame		5.1.1 Hole drilled on marked place. 5.1.2 Optical Distribution Frame (ODF) assembled. 5.1.3 ODF mounted and tightly fixed with alignment.					
5.2 Pull underground/feeder cable		5.2.1 Duct checked for damage and breakage. 5.2.2 Duct inner surface cleared. 5.2.3 Nylon rope inserted through duct. 5.2.4 Steel rope tied with nylon rope and pulled through another manhole. 5.2.5 Cable grip fitted to sub duct. 5.2.6 Sub duct pulled through another manhole. 5.2.7 Optical cable passed through sub duct. 5.2.8 Spare sub duct sealed. 5.2.9 Cable loop of 5-25 meters prepared at end of underground cable and sealed.					



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5.3 Install fiber distribution cabinet/curb	5.3.1 Hole drilled on cabinet base. 5.3.2 Expansion bolt fitted. 5.3.3 Fiber distribution curb (FDC) mounted on cabinet base. 5.3.4 FDC tightly fixed with proper alignment. 5.3.5 Earthing connected to FDC.				
5.4 Perform fiber patching	5.4.1 Patch cable selected. 5.4.2 Ports identified. 5.4.3 Patch cord inserted into ports.				
5.5 Erect pole	5.5.1 Pole location marked as per secondary network polling diagram. 5.5.2 Hole dug to 1/6 of the pole length. 5.5.3 Pole placed safely in hole. 5.5.4 Pole alignment checked and fixed.				
5.6 Fit pole accessories	5.6.1 Position of pole accessories marked clearly on pole. 5.6.2 Pole accessories tightly fitted with eriband.				
5.7 Pull aerial optical cable	5.7.1 Aerial optical cable laid safely on ground. 5.7.2 Aerial optical cable raised to cable roller fixed on pole. 5.7.3 Messenger wire of cable fixed on starting pole. 5.7.4 Aerial optical cable pulled maintaining sag, ground and electrical clearance.				
5.8 Perform cable termination	5.8.1 Feeder cable entered through left side of cabinet. 5.8.2 Distribution cable entered through right side of cabinet. 5.8.3 Cable prepared for splicing. 5.8.4 Each fiber spliced with pig tail. 5.8.5 Joint placed on tray and pig tail fixed on port.				
5.9 Perform splicing and enclosing	5.9.1 Optical cable fitted on optical fiber enclosure. 5.9.2 120-150 cm sheath opened each side of cable. 5.9.3 Tube removed. 5.9.4 Protection sleeve inserted. 5.9.5 Fiber core cleaned and fusion. 5.9.6 Loss measured from 0 to 0.02 dB.				



	5.9.7 Protection sleeve heated. 5.9.8 Protection sleeve inserted into groove. 5.9.9 Fiber placed into enclosure tray with a figure of eight. 5.9.10 Enclosure tightly closed.				
5.10 Fit Fiber Access Point	5.10.1 Fiber Access Point (FAP) position marked as per distribution network polling diagram. 5.10.2 FAP fixed firmly.				
5.11 Perform labelling and numbering	5.11.1 Number assigned to port of ODF block-wise in sequential order. 5.11.2 Number assigned to feeder and distribution port at FDC. 5.11.3 Number assigned to FAP. 5.11.4 Subduct and feeder cable numbered.				
5.12 Prepare as built drawing	5.12.1 Modification updated in given drawing.				

WT- Written Test

OQ- Oral Question

PT- Practical Test

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Range Statement

Variable	Range
Position of pole accessories	<i>May include but not limited to:</i> • Distribution bracket: 20 cm from top of the pole • Stay seat: 40 cm from top of the pole • Pin type bracket: 50 cm from top of the pole • Anchoring eye: 50 cm from top of the pole • Suspension clamp: 50 cm from top of the pole • Bridle ring: 80 to 110 cm from top of the pole
Pole accessories	<i>May include but not limited to:</i> • Distribution bracket • Stay seat • Pin type bracket • Anchoring eye • Suspension clamp • Bridle ring



5	Unit No: 6 Unit Title: Perform testing	Unit code:
	Elements of competency	Performance standards
	6.1 Test voltage	6.1.1 Selector turned into DC voltage. 6.1.2 Test probe connected to 'a' wire and 'b' wire. 6.1.3 Voltage reading checked and recorded. 6.1.4 'a' wire to ground voltage checked and recorded. 6.1.5 'b' wire to ground voltage checked and recorded.
	6.2 Test current	6.2.1 Selector turned into ammeter. 6.2.2 Test probe connected to 'a' wire and 'b' wire. 6.2.3 Current reading checked and recorded. 6.2.4 'a' wire to ground current checked and recorded. 6.2.5 'b' wire to ground current checked and recorded.
	6.3 Test resistance	6.3.1 'a' wire and 'b' wire connected with megger. 6.3.2 Insulation resistance measured in Megaohm and recorded. 6.3.3 Loop resistance measured in ohm and recorded. 6.3.4 'a' wire to ground resistance checked and recorded. 6.3.5 'b' wire to ground resistance checked and recorded.
	6.4 Test capacitance	6.4.1 'a' wire and 'b' wire connected with capacitance meter. 6.4.2 Capacitance between 'a' wire to 'b' wire measured and recorded. 6.4.3 Capacitance between 'a' wire to ground measured and recorded. 6.4.4 Capacitance between 'b' wire to ground measured and recorded.
	6.5 Test earthing	6.5.1 Two electrodes hammered into ground as specified in earth meter. 6.5.2 Earth wire and two electrodes rod/probe connected with earth meter. 6.5.3 Earth resistance measured and recorded.
	6.6 Test continuity	6.6.1 Each end of 'a' wire and 'b' wire connected to test probe of cable test set. 6.6.2 Tone test probe connected with test pair. 6.6.3 Wire continuity checked and recorded.



	6.7 Test signal power	6.7.1 Attenuation measured and recorded. 6.7.2 Received signal strength measured and recorded.
	6.8 Test line of sight	6.8.1 Mirror test performed from receiving and transmitting points. 6.8.2 Mirror reflection received at another end.
6	Task Performance Requirements (Tools, Equipment and Materials): Knife, crimping tool, plier, screw driver, Phase tester, Line tester, Hacksaw, Mono Phone, Earth meter, Multimeter, Megger, ADSL tester, VFL tester, OTDR (Optical Time Domain Reflectometer), Power meter, Clamp meter (Tongue tester), C-meter, Ohm meter, Ammeter, Metal detector, Tube cutter, Adjustable wrench, Tone probe, Laser source, Mirror, drop fiber stripper, slitter, Round cutter, Sheath cutter, Fiber cleaner, dB Meter, Hydrometer and PPE.	
7	Safety and Hygiene (Occupational Health and Safety): - Use personal protective equipment. - Safe handling of materials, tools and equipment. - Hazards involved in lifting tools, equipment and materials. - Hazards involved in sharp objects. - Hazards involved due to short circuit and electricity.	



8	Required Knowledge		
	Technical Knowledge	Applied Calculation	Graphical Information
	- Tools and equipment: - Types - Uses - Safe handling - Fundamentals of electrical and electronics - Voltage - Current - Power - Resistance - Capacitance - Continuity - Frequency - Attenuation - Line of sight - Earthing and its type - Signal test - Log table		- Read and interpret manual/instructional guide. - Read and interpret circuit diagram. - Read and interpret drawing/sketch.



9	Assessment of Competency						
	Unit: 6 Unit Title: Perform testing						
	Candidate Details			Assessors Detail			
	Candidate's Name: Registration Number: Symbol No: Test Centre:			Assessors' Name 1. 2. 3.		ID/License No:	
Element of competency		Performance Standards		Standard Met	Standard Not Met	Evidence Type	Comments
6.1 Test voltage		6.1.1 Selector turned into DC voltage. 6.1.2 Test probe connected to 'a' wire and 'b' wire. 6.1.3 Voltage reading checked and recorded. 6.1.4 'a' wire to ground voltage checked and recorded. 6.1.5 'b' wire to ground voltage checked and recorded.					
6.2 Test current		6.2.1 Selector turned into ammeter. 6.2.2 Test probe connected to 'a' wire and 'b' wire. 6.2.3 Current reading checked and recorded. 6.2.4 'a' wire to ground current checked and recorded. 6.2.5 'b' wire to ground current checked and recorded.					
6.3 Test resistance		6.3.1 'a' wire and 'b' wire connected with megger. 6.3.2 Insulation resistance measured in Megaohm and recorded. 6.3.3 Loop resistance measured in ohm and recorded. 6.3.4 'a' wire to ground resistance checked and recorded. 6.3.5 'b' wire to ground resistance checked and recorded.					



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6.4 Test capacitance	6.4.1 'a' wire and 'b' wire connected with capacitance meter. 6.4.2 Capacitance between 'a' wire to 'b' wire measured and recorded. 6.4.3 Capacitance between 'a' wire to ground measured and recorded. 6.4.4 Capacitance between 'b' wire to ground measured and recorded.				
6.5 Test earthing	6.5.1 Two electrodes hammered into ground as specified in earth meter. 6.5.2 Earth wire and two electrodes rod/probe connected with earth meter. 6.5.3 Earth resistance measured and recorded.				
6.6 Test continuity	6.6.1 Each end of 'a' wire and 'b' wire connected to test probe of cable test set. 6.6.2 Tone test probe connected with test pair. 6.6.3 Wire continuity checked and recorded.				
6.7 Test signal power	6.7.1 Attenuation measured and recorded. 6.7.2 Received signal strength measured and recorded.				
6.8 Test line of sight	6.8.1 Mirror test performed from receiving and transmitting points. 6.8.2 Mirror reflection received at another end.				

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5	Unit No: 7 Unit Title: Distribute subscriber line	Unit code:
	Elements of competency	Performance standards
	7.1 Perform telephone/FTTH survey	7.1.1 Customer location and nearest DP/FAP and cabinet identified. 7.1.2 Estimate drawing prepared showing nearest DPs/FAPs around customer location and Drop wire/fiber distance. 7.1.3 Estimate prepared. 7.1.4 Estimate form filled up with required information. • Drop wire/fiber • House wire • Distribution bracket • Bridle ring • Fastener hook • Eye bolt • Roset • Line cord and telephone set
	7.2 Perform MDF jumpering	7.2.1 Telephone number port identified. 7.2.2 Primary pair number identified. 7.2.3 Primary pair number and telephone number port connected. 7.2.4 Fuse inserted in identified primary pair. 7.2.5 Incoming and outgoing call checked.
	7.3 Perform cabinet jumpering	7.3.1 Primary pair number identified. 7.3.2 Secondary pair number identified. 7.3.3 Identified primary pair and secondary pair connected. 7.3.4 Incoming and outgoing call checked.
	7.4 Prepare fiber connector	7.4.1 Support wire separated without damaging fiber. 7.4.2 Drop fiber sheath removed. 7.4.3 Fiber coating removed without breaking fiber. 7.4.4 Fiber cleaned. 7.4.5 Fiber cut to appropriate length. 7.4.6 Fiber connected to fast mechanical connector.



		7.4.7 Fiber connector tested.
	7.5 Connect telephone/ADSL line	7.5.1 DP pair number identified. 7.5.2 Drop wire laid to customer premises. 7.5.3 Drop wire connected to DP. 7.5.4 Drop wire pulled and fixed maintaining sag, ground and electrical clearance. 7.5.5 Drop wire connected to terminating block. 7.5.6 Terminating block connected to Roset box. 7.5.7 ADSL splitter connected to Roset box. 7.5.8 Telephone set connected through Roset box/ADSL splitter. 7.5.9 Data line of splitter connected to ADSL router. 7.5.10 Telephone line and ADSL connection tested.
	7.6 Connect customer premises equipment (CPE)	7.6.1 FAP port identified 7.6.2 Drop fiber laid to customer premises. 7.6.3 Drop fiber connected to FAP port. 7.6.4 Drop fiber pulled and fixed maintaining sag, ground and electrical clearance. 7.6.5 Drop fiber patched to CPE. 7.6.6 Voice and data connection tested.
6	Task Performance Requirements (Tools, Equipment and Materials): Measuring wheel, Measuring tape, Rope, Hammer, Insertion tool, Knife, Cable cutter, Crimping tool, Nose plier, Plier, Side cutter, Screw driver, Hacksaw, Mono Phone, Fiber stripper, Fiber splicing machine, Source power meter, ODTR meter, Power meter, Ohm meter, Ammeter, Fiber clever, Eriband (Steel band), Eriband seal, Multimeter, Megger, ADSL tester, RJ-45 clammer, Laser source, Tube cutter, Lap cutter, Adjustable wrench, Drop Fiber Stripper, Splitter, Fiber cleaner, slitte, round cutter, Distribution bracket, Bridle Ring, Drop wire/fiber, Drop wire connector, Rozzet (Krone box), Laptop, ADSL Router, RJ-45 Jack, UTP/CAT 6 cable, LAN Patch Cable, Fiber Mechanical Connector and PPE	



7	Safety and Hygiene (Occupational Health and Safety): • Use personal protective equipment. • Safe handling of materials, tools and equipment. • Hazards involved in lifting tools, equipment and materials. • Hazards involved in sharp objects. • Hazards involved due to short circuit and electricity.
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8	Required Knowledge		
	Technical Knowledge	Applied Calculation	Graphical Information
	- Tools and equipment: - Types - Uses - Safe handling - Subscriber line - Telephone line - ADSL - Lease line - Optical fiber - Modem and router - Customer premises equipment - Purpose of MDF and cabinet installation - MDF and cabinet structure		- Read and interpret manual/instructional guide. - Read and interpret circuit diagram. - Read and interpret drawing/sketch.



9	Assessment of Competency						
	Unit: 7 Unit Title: Distribute subscriber line						
	Candidate Details			Assessors Detail			
	Candidate's Name: Registration Number: Symbol No: Test Centre:			Assessors' Name 1. 2. 3.		ID/License No:	
Element of competency		Performance Standards		Standard Met	Standard Not Met	Evidence Type	Comments
7.1 Perform telephone/FTTH survey		7.1.1 Customer location and nearest DP/FAP and cabinet identified. 7.1.2 Estimate drawing prepared showing nearest DPs/FAPs around customer location and Drop wire/fiber distance. 7.1.3 Estimate prepared. 7.1.4 Estimate form filled up with required information. • Drop wire/fiber • House wire • Distribution bracket • Bridle ring • Fastener hook • Eye bolt • Roset • Line cord and telephone set					



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7.2 Perform MDF jumpering	7.2.1 Telephone number port identified. 7.2.2 Primary pair number identified. 7.2.3 Primary pair number and telephone number port connected. 7.2.4 Fuse inserted in identified primary pair. 7.2.5 Incoming and outgoing call checked.				
7.3 Perform cabinet jumpering	7.3.1 Primary pair number identified. 7.3.2 Secondary pair number identified. 7.3.3 Identified primary pair and secondary pair connected. 7.3.4 Incoming and outgoing call checked.				
7.4 Prepare fiber connector	7.4.1 Support wire separated without damaging fiber. 7.4.2 Drop fiber sheath removed. 7.4.3 Fiber coating removed without breaking fiber. 7.4.4 Fiber cleaned. 7.4.5 Fiber cut to appropriate length. 7.4.6 Fiber connected to fast mechanical connector. 7.4.7 Fiber connector tested.				
7.5 Connect telephone/ADSL line	7.5.1 DP pair number identified. 7.5.2 Drop wire laid to customer premises. 7.5.3 Drop wire connected to DP. 7.5.4 Drop wire pulled and fixed maintaining sag, ground and electrical clearance. 7.5.5 Drop wire connected to terminating block. 7.5.6 Terminating block connected to Roset box. 7.5.7 ADSL splitter connected to Roset box. 7.5.8 Telephone set connected through Roset box/ADSL splitter. 7.5.9 Data line of splitter connected to ADSL router. 7.5.10 Telephone line and ADSL connection tested.				



7.6 Connect customer premises equipment (CPE)	7.6.1 FAP port identified 7.6.2 Drop fiber laid to customer premises. 7.6.3 Drop fiber connected to FAP port. 7.6.4 Drop fiber pulled and fixed maintaining sag, ground and electrical clearance. 7.6.5 Drop fiber patched to CPE. 7.6.6 Voice and data connection tested.				
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WT- Written Test

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SN–Simulation

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5	Unit No: 8 Unit Title: Perform computer works	Unit code:
	Elements of competency	Performance standards
	8.1 Setup modem/router	8.1.1 Router/modem accessed. 8.1.2 IP configured. 8.1.3 Network details obtained. 8.1.4 ADSL router configured.
	8.2 Perform data forward and storage	8.2.1 Work order received. 8.2.2 Work completion report entered.
	8.3 Handle complaint	8.3.1 Customer/client complaint recorded. 8.3.2 Complaint status updated.
	8.4 Receive and forward email	8.4.1 Work order/information received through email. 8.4.2 Work status updated through email. 8.4.3 Work order/information forwarded to concerned person.
	8.5 Maintain record	8.5.1 Updated status of work gathered. 8.5.2 Record updated.
6	Task Performance Requirements (Tools, Equipment and Materials): Computer set with internet facility, modem, router, pen, paper, register and PPE.	
7	Safety and Hygiene (Occupational Health and Safety): - Use personal protective equipment. - Safe handling of materials, tools and equipment. - Hazards involved in lifting tools, equipment and materials. - Hazards involved in sharp objects. - Hazards involved due to short circuit and electricity.	



8	Required Knowledge		
	Technical Knowledge	Applied Calculation	Graphical Information
	○ Fundamentals of computer ○ Modem and router ○ IP concept ○ email and internet ○ Fundamentals of computer network ○ Customer care ○ Record keeping system		● Read and interpret manual/instructional guide. ● Read and interpret drawing/sketch.



9	Assessment of Competency						
	Unit: 8 Unit Title: Perform computer works						
	Candidate Details			Assessors Detail			
	Candidate's Name: Registration Number: Symbol No: Test Centre:			Assessors' Name 1. 2. 3.		ID/License No:	
Element of competency		Performance Standards		Standard Met	Standard Not Met	Evidence Type	Comments
8.1 Setup modem/router		8.1.1 Router/modem accessed. 8.1.2 IP configured. 8.1.3 Network details obtained. 8.1.4 ADSL router configured.					
8.2 Perform data forward and storage		8.2.1 Work order received. 8.2.2 Work completion report entered.					
8.3 Handle complaint		8.3.1 Customer/client complaint recorded. 8.3.2 Complaint status updated.					
8.4 Receive and forward email		8.4.1 Work order/information received through email. 8.4.2 Work status updated through email. 8.4.3 Work order/information forwarded to concerned person.					
8.5 Maintain record		8.5.1 Updated status of work gathered. 8.5.2 Record updated.					



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5	Unit No: 9 Unit Title: Repair and maintain network	Unit code:
	Elements of competency	Performance standards
	9.1 Identify Fault	9.1.1 Visual inspection performed for: - Physical damage - Burnt - Breakage - Indicator/alarm 9.1.2 Voltage, capacitance, insulation/resistance and continuity tested. 9.1.3 Fiber breakage point identified. 9.1.4 Power/transmission loss tested. 9.1.5 Fault located.
	9.2 Replace fuse	9.2.1 Damaged fuse removed. 9.2.2 Fuse rating and type selected. 9.2.3 Fuse inserted. 9.2.4 Output voltage tested.
	9.3 Replace card	9.3.1 Faulty card removed from slot. 9.3.2 Card type selected. 9.3.3 Card inserted into slot. 9.3.4 Line tested.
	9.4 Repair power system	9.4.1 Battery condition, terminal voltage and connection checked. 9.4.2 Charge controller, inverter, MCB, switches, power socket checked 9.4.3 Rectifier module checked. 9.4.4 Faulty connection repaired. 9.4.5 Faulty device/component replaced.
	9.5 Replace damaged equipment/accessories	9.5.1 Faulty equipment/accessories removed. 9.5.2 Equipment/accessories selected. 9.5.3 New equipment/accessories installed. 9.5.4 Patch cord replaced.
	9.6 Maintain transmission radio/antenna	9.6.1 Radio equipment and antenna checked for physical damage. 9.6.2 Faulty radio equipment removed.



		9.6.3 New radio equipment installed. 9.6.4 Antenna alignment adjusted.
	9.7 Repair subscriber line	9.7.1 Dial tone tested. 9.7.2 Jumper wire replaced. 9.7.3 Drop wire/fiber replaced. 9.7.4 LAN cable repaired. 9.7.5 Faulty telephone set/router/CPE replaced.
6	Task Performance Requirements (Tools, Equipment and Materials): Measuring tape, Hammer, Tamping tool, Insertion tool, Cable cutter, Knife, Web cutter, Crimping tool, Nose plier, Plier, Side cutter, Phase tester, Line tester, Screw driver, Hacksaw blade, Mono Phone, Fiber splicing machine, Fiber stripper, Fiber cleaver, UG cable splicing machine, Cable fault localizer, Source power meter (OFC), Eriband (Steel band), Eriband seal, Ventilator, Compass, GPS, Multimeter, Megger, ADSL tester, VFL tester, OTDR (Optical Time Domain Reflectometer), Power meter, Earth meter, Clamp meter (Tongue tester), C-meter, Ohm meter, Ammeter, Sheath cutter, Fiber cutter, RJ-45 clammer, Tube cutter, Lap cutter, Adjustable wrench, Walkie-talkie, Metal detector, Tone probe, Laser source, Drop Fiber Stripper, Slitter, Round cutter (OFC), Vertical and Horizontal sheath cutter, Fiber cleaner, Distribution bracket, Bridle Ring, Distribution point (DP), FAP, Cable (optical/copper), Drop wire, Mechanical Optical fiber connector, Drop wire connector, UY2 connector, Rozzet (Krone box), Tag (Krone/pouyet), Closure (Aerial/UG), Modular connector (UG), U-knot, MCB/MCCB, Power cable, Rectifier, Battery, Solar panel (Module/array), Solar power controller, Soldering and PPE.	
7	Safety and Hygiene (Occupational Health and Safety): - Use personal protective equipment. - Safe handling of materials, tools and equipment. - Hazards involved in lifting tools, equipment and materials. - Hazards involved in sharp objects. - Hazards involved due to short circuit and electricity.	



8	Required Knowledge		
	Technical Knowledge	Applied Calculation	Graphical Information
	- Tools and equipment: - Types - Uses - Safe handling - Fault type - Fault finding procedure - Troubleshooting technique		- Read and interpret manual/instructional guide. - Read and interpret circuit diagram. - Read and interpret drawing/sketch.



9	Assessment of Competency						
	Unit: 9 Unit Title: Repair and maintain network						
	Candidate Details			Assessors Detail			
	Candidate's Name: Registration Number: Symbol No: Test Centre:			Assessors' Name 1. 2. 3.		ID/License No:	
Element of competency		Performance Standards		Standard Met	Standard Not Met	Evidence Type	Comments
9.1 Identify Fault		9.1.1 Visual inspection performed for: - Physical damage - Burnt - Breakage - Indicator/alarm 9.1.2 Voltage, capacitance, insulation/resistance and continuity tested. 9.1.3 Fiber breakage point identified. 9.1.4 Power/transmission loss tested. 9.1.5 Fault located.					
9.2 Replace fuse		9.2.1 Damaged fuse removed. 9.2.2 Fuse rating and type selected. 9.2.3 Fuse inserted. 9.2.4 Output voltage tested.					
9.3 Replace card		9.3.1 Faulty card removed from slot. 9.3.2 Card type selected. 9.3.3 Card inserted into slot.					



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	9.3.4	Line tested.				
9.4	Repair power system	9.4.1 Battery condition, terminal voltage and connection checked. 9.4.2 Charge controller, inverter, MCB, switches, power socket checked 9.4.3 Rectifier module checked. 9.4.4 Faulty connection repaired. 9.4.5 Faulty device/component replaced.				
9.5	Replace damaged equipment/accessories	9.5.1 Faulty equipment/accessories removed. 9.5.2 Equipment/accessories selected. 9.5.3 New equipment/accessories installed. 9.5.4 Patch cord replaced.				
9.6	Maintain transmission radio/antenna	9.6.1 Radio equipment and antenna checked for physical damage. 9.6.2 Faulty radio equipment removed. 9.6.3 New radio equipment installed. 9.6.4 Antenna alignment adjusted.				
9.7	Repair subscriber line	9.7.1 Dial tone tested. 9.7.2 Jumper wire replaced. 9.7.3 Drop wire/fiber replaced. 9.7.4 LAN cable repaired. 9.7.5 Faulty telephone set/router/CPE replaced.				

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5	Unit No: 10 Unit Title: Migrate network	Unit code:	
	Elements of competency	Performance standards	
	10.1 Check existing record	10.1.1 10.1.2	Existing record verified with latest field data. Record updated.
	10.2 Install new equipment	10.2.1 10.2.2 10.2.3 10.2.4 10.2.5	Rectifier installed firmly as per drawing. Switching/Access equipment installed firmly as per drawing. MDF installed firmly as per drawing. Battery bank installed firmly as per drawing. Port termination checked in MDF number side.
	10.3 Perform T joint	10.3.1	Switch board cable from new MDF spliced to existing cable without interrupting service.
	10.4 Verify network migration	10.4.1	Record from existing MDF replicated in new MDF.
	10.5 Perform jumpering	10.5.1 10.5.2 10.5.3	Number side port and primary pair connected in new MDF. Connection verified as per record. Faulty connection rectified.
	10.6 Perform dismantling	10.6.1 10.6.2 10.6.3	Old system dismantled safely. Dismantled equipment/parts stored. Record updated.
6	Task Performance Requirements (Tools, Equipment and Materials): Measuring tape, Hammer, Tamping tool, Insertion tool, Cable cutter, Knife, Web cutter, Crimping tool, Nose plier, Plier, Side cutter, Phase tester, Line tester, Screw driver, Hacksaw blade, Mono Phone, Fiber splicing machine, Fiber stripper, Fiber clever, UG cable splicing machine, Cable fault localizer, Source power meter (OFC), Eriband (Steel band), Eriband seal, Ventilator, Compass, GPS, Multimeter, Megger, ADSL tester, VFL tester, OTDR (Optical Time Domain Reflectometer), Power meter, Earth meter, Clamp meter (Tongue tester), C-meter, Ohm meter, Ammeter, Sheath cutter, Fiber cutter, RJ-45 clasper, Tube cutter, Lap cutter, Adjustable wrench, Walkie-talkie, Metal detector, Tone probe, Laser source, Drop Fiber Stripper, Slitter, Round cutter (OFC), Vertical and Horizontal sheath cutter, Fiber cleaner, Distribution bracket, Bridle Ring, Distribution point (DP), FAP, Cable (optical/copper), Drop wire, Mechanical Optical fiber connector, Drop wire connector, UY2 connector, Rozzet (Krone box), Tag (Krone/pouyet), Closure (Aerial/UG), Modular connector (UG), U-knot, MCB/MCCB, Power cable, Rectifier, Battery, Solar panel (Module/array), Solar power controller, Soldering and PPE.		



7	Safety and Hygiene (Occupational Health and Safety): • Use personal protective equipment. • Safe handling of materials, tools and equipment. • Hazards involved in lifting tools, equipment and materials. • Hazards involved in sharp objects. • Hazards involved due to short circuit and electricity.
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8	Required Knowledge		
	Technical Knowledge	Applied Calculation	Graphical Information
	- Tools and equipment: - Types - Uses - Safe handling - Migrate network - Purpose of network migration - Dismantling procedure - Storing and record keeping		- Read and interpret manual/instructional guide. - Read and interpret drawing/sketch.



9	Assessment of Competency						
	Unit: 10 Unit Title: Migrate network						
	Candidate Details			Assessors Detail			
	Candidate's Name: Registration Number: Symbol No: Test Centre:			Assessors' Name 1. 2. 3.		ID/License No:	
Element of competency		Performance Standards		Standard Met	Standard Not Met	Evidence Type	Comments
10.1 Check existing record		10.1.1 Existing record verified with latest field data. 10.1.2 Record updated.					
10.2 Install new equipment		10.2.1 Rectifier installed firmly as per drawing. 10.2.2 Switching/Access equipment installed firmly as per drawing. 10.2.3 MDF installed firmly as per drawing. 10.2.4 Battery bank installed firmly as per drawing. 10.2.5 Port termination checked in MDF number side.					
10.3 Perform T joint		10.3.1 Switch board cable from new MDF spliced to existing cable without interrupting service.					
10.4 Verify network migration		10.4.1 Record from existing MDF replicated in new MDF.					
10.5 Perform jumpering		10.5.1 Number side port and primary pair connected in new MDF. 10.5.2 Connection verified as per record.					



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	10.5.3	Faulty connection rectified.				
10.6 Perform dismantling	10.6.1	Old system dismantled safely.				
	10.6.2	Dismantled equipment/parts stored.				
	10.6.3	Record updated.				

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