

National Occupational Skill Standard (NOSS)

Occupational Title : Computer Hardware and Network Technician

Level : 2

Sector : Computer

Sub - Sector : Computer Hardware and Network

NOSS ID/NSCO ID :

ISCO NO :



Council for Technical Education and Vocational Training

NATIONAL SKILL TESTING BOARD

Madhyapur Thimi-17, Sanothimi, Bhaktapur, Nepal

Revised: 03-02-2023 (20-10-2079)



2045

DACUM Panel

S.No.	Name	Designation	Organization
1.	Mr. Deepak Chhetri	Member	Worldlink Communication (P) Ltd, Jawalakhel, Lalitpur
2.	Mr. Pradeep Manadhar	Member	Cloud Tech Solution, Binayaknagar, Kathmandu
3.	Mr. Jagadish Poudel	Member	Trident Computer Institute, Danchhi, Kathmandu
4.	Mr. Arun Pokharel	Member	Kathmandu School of Law, Dadikot, Bhaktapur
5.	Mr. Jemant Pradhan	Member	Taleju IT and Electronics, Balkumari, Lalitpur
6.	Mr. Ram Shrestha	Member	DAV College of Information Technology, Jawalakhel, Lalitpur
7.	Mr. Bikesh Chansi	Member	Modern Electronics Institute, Maitighar, Kathmandu
8.	Mr Niroj Maharjan	Member	AP Technology, Newroad, Kathmandu
9.	Mr. Kishor Baniya	Member	Cyberland & Communication, Minbhawan, Kathmandu
10.	Mr. Rabindra Maharjan	Member	BEST Tech System, Newroad, Kathmandu
11.	Mr. Mahesh Shakya	Member	Microsoft Silverlight Institute, Lagankhel, Lalitpur
12.	Mr. Sushil Chandra Paudel	Member	Unique Engineering & IT Support (P) Ltd., Putalisadak, Kathmandu

DACUM Facilitator/Co-facilitator:

1. Mr. Tulsi K.C., Sr. Skill Testing Officer, NSTB, Sanothimi, Bhaktapur
2. Mr. Suresh Maharjan, Skill Testing Officer, NSTB, Sanothimi, Bhaktapur

DACUM Workshop on 23 & 24 June 2014



NOSS ID #

Developed Date: 2018-10-11

Revision Number: 01

Revised Date: 2023-02-03

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3.	Mr. Prem Narayan Regmi	Member	IT Technical Pvt. Ltd., Bagbazar, Kathmandu
4.	Mr. Dipendra Neupane	Member	Sanothimi Technical School, Sanothimi, Bhaktapur
5.	Mr. Kamal Khatri	Member	Computer Point Nepal, Ghantaghar, Kathmandu
6.	Mr. Binod Bikram Magaiya	Member	Rai School, Jorpati, Kathmandu
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DACUM Facilitator/Co-facilitator:

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DACUM Workshop on 14 July 2014



NOSS ID #

Developed Date: 2018-10-11

Revision Number: 01

Revised Date: 2023-02-03

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Recommended by Computer Technical Sub Committee: 25 July 2014



NOSS ID #

Developed Date: 2018-10-11

Revision Number: 01

Revised Date: 2023-02-03

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Recommended by Computer Technical Sub Committee: 11 October 2018 (25 Asoj 2075)



NOSS ID #

Developed Date: 2018-10-11

Revision Number: 01

Revised Date: 2023-02-03

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The National Occupational Skill Standard Revised by:

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5.	Mr. Bikesh Maharjan	Member	Nextgen Solutions Pvt. Ltd. Singha Durbar, Kathmandu
6.	Mr. Navin Chalise	Member	System Bull ICT College Bafal, Kathmandu
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Recommended by Computer Technical Sub Committee: 03 February 2023 (20 Magh 2079)



NOSS ID #

Developed Date: 2018-10-11

Revision Number: 01

Revised Date: 2023-02-03

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1	Occupational Title: Computer Hardware and Network Technician Level: 2
2	Job Description: Computer Hardware Technician, L-2, repairs and maintains computer system, setups and configures computer network, performs installation and basic configuration of windows server operating system, performs installation and basic configuration of Linux server operating system and installs CC camera.
3	UNITS OF COMPETENCY: <ol style="list-style-type: none"> 1. Repair and maintain computer system 2. Setup and configure computer network 3. Perform installation and basic configuration of windows server operating system 4. Perform installation and basic configuration of Linux server operating system 5. Install CC camera 6. Perform communication 7. Develop professionalism <p><i>*Note: Unit 6 and 7 are not for testing purpose.</i></p>
4	Qualifying Notes/Prerequisites: <ul style="list-style-type: none"> • Physical Requirements: Sound health • Entry Requirements: As per NSTB rules Additional Information: <ul style="list-style-type: none"> • Assessment Types: Performance and written test • Assessment Duration: 8 to 10 Hours (Full Competency) 4 to 6 hours (Single/combine Competency) • Recommended Group Size: 5 to 7 candidates



5	Unit No:1		Unit code:
	Unit Title: Repair and maintain computer system		
	Elements of competency	Performance standards	
	1.1 Prepare tools, equipment and materials	1.1.1 Personal protective equipment (PPE) used in accordance with task requirement. 1.1.2 Tools, equipment and materials collected as per task requirement. 1.1.3 Bootable media with required operating system (OS) created.	
	1.2 Analyze computer system	1.2.1 Information related to computer problem collected from client. 1.2.2 Computer system visually observed for computer problem. 1.2.3 Beep sound and error messages interpreted. 1.2.4 Computer system tested for computer problem. 1.2.5 Computer problem identified based on the test result.	
1.3 Estimate cost	1.3.1 Materials listed with technical specification as per the fault. 1.3.2 Cost of repair calculated including material cost and service charge. 1.3.3 Customer informed about estimated cost for repair and risk factor. 1.3.4 Customer approval obtained prior to repair work.		
1.4 Repair computer system	1.4.1 Data backed up from the local drive and stored in specific location . 1.4.2 Software problems fixed using software issues resolving technique . 1.4.3 Hardware faults repaired/replaced as per manufacturer's instruction. 1.4.4 Computer system tested for normal operation. 1.4.5 Data restored to previous location. 1.4.6 Fault and maintenance data recorded along with the solution.		



	1.5 Clean workplace	<p>1.5.1 Tools and equipment cleaned and stored in designated area.</p> <p>1.5.2 Workplace cleaned neatly and waste disposed as per 3R's principle in designated area.</p>
6	<p>Task Performance Requirements (Tools, Equipment and Materials):</p> <ul style="list-style-type: none"> • Computer, bootable media, device driver, software package, storage device (optical disk, USB disk, external hard disk drive), power cord, extension cord, phase tester, multimeter, screwdriver, pliers, thermal paste, wire cutter, flash light, soldering iron, wire, paste, tweezers, air blower, brush, rag/cotton, dustbin, dustpan and Personal Protective Equipment (PPE). 	
7	<p>Safety and Hygiene (Occupational Health and Safety):</p> <ul style="list-style-type: none"> • Apply Personal Protective Equipment (PPE). • Disconnect power supply. • Prevent from electric shock. • Maintain proper posture (Avoid awkward position). 	



8	Required Knowledge		
	Technical Knowledge	Applied Calculation	Graphical Information
	<ul style="list-style-type: none"> • Fundamentals of computer <ul style="list-style-type: none"> ○ Introduction ○ Basic block diagram of computer system ○ Working principle • Computer hardware <ul style="list-style-type: none"> ○ Introduction ○ Computer components and peripherals ○ Types, uses and specification of computer components ○ Input, output, processing and storage device ○ Port and their types • Software <ul style="list-style-type: none"> ○ Operating software ○ Application software ○ Utility software ○ File system • Basic electronics <ul style="list-style-type: none"> ○ Resistor, capacitor and inductor ○ Diode, transistor and IC 	<ul style="list-style-type: none"> • Calculate repair cost • Convert storage capacity into different storage/memory units 	<ul style="list-style-type: none"> • Read and interpret manufacturer's manual/specification • Read and interpret error message and code



	<ul style="list-style-type: none"> ○ Current, voltage, resistance, energy, frequency and power ○ Circuit and it's types ● BIOS setup ● Assemble and disassemble process ● SMPS and power ratings ● Troubleshooting process ● Problem resolving technique ● Routine maintenance ● Beep code and error messages ● Data backup and restore ● Safe mode ● Windows registry and administrative tools ● Internal and external DOS commands ● Remotely supporting utilities ● Search engine and searching techniques ● Technical documentation 		
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9	Assessment of Competency					
Unit: 1 Unit Title: Repair and maintain computer system						
Candidate Details			Assessors Detail			
Candidate's Name:			Assessors' Name		ID/License No:	
Registration Number:			1.			
Symbol No:			2.			
Test Centre:			3.			
Test Date:						
Element of competency	Performance Standards		Standard Met	Standard Not Met	Evidence Type	Comments
1.1 Prepare tools, equipment and materials	1.1.1 Personal protective equipment (PPE) used in accordance with task requirement.					
	1.1.2 Tools, equipment and materials collected as per task requirement.					
	1.1.3 Bootable media with required operating system (OS) created.					
1.2 Analyze computer system	1.2.1 Information related to computer problem is collected from client.					
	1.2.2 Computer system visually observed for computer problem.					
	1.2.3 Beep sound and error messages are interpreted.					



	<p>1.2.4 Computer system tested for computer problem.</p> <p>1.2.5 Computer problem identified based on the test result.</p>				
1.3 Estimate cost	<p>1.3.1 Materials listed with technical specification as per the fault.</p> <p>1.3.2 Cost of repair calculated including material cost and service charge.</p> <p>1.3.3 Customer informed about estimated cost for repair and risk factor.</p> <p>1.3.4 Customer approval obtained prior to repair work.</p>				
1.4 Repair computer system	<p>1.4.1 Data backed up from the local drive and stored in specific location.</p> <p>1.4.2 Software problems fixed using software issues resolving technique.</p> <p>1.4.3 Hardware faults repaired/replaced as per manufacturer's instruction.</p> <p>1.4.4 Computer system tested for normal operation.</p> <p>1.4.5 Data restored to previous location.</p> <p>1.4.6 Fault and maintenance data recorded along with the solution.</p>				
1.5 Clean workplace	<p>1.5.1 Tools and equipment cleaned and stored in designated area.</p>				



	1.5.2 Workplace cleaned neatly and waste disposed as per 3R's principle in designated area.				
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WT- Written Test

OQ- Oral Question

PT- Practical Test

DO – Direct Observation

SR- Supervisor’s report

SN–Simulation

RP- Role Play

PG –Photographs

VD- Video

CT – Certificates

TS – Testimonials (Reward)

PP – Product Produced

CS – Case Study



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Range Statement

Variable	Range
Personal protective equipment	<p><i>May include but not limited to:</i></p> <ul style="list-style-type: none"> • Goggles • Apron • Gloves • Antistatic suits • Shoes
Media	<p><i>May include but not limited to:</i></p> <ul style="list-style-type: none"> • USB disk • Optical disk • External hard disk drive
Operating system	<p><i>May include but not limited to:</i></p> <ul style="list-style-type: none"> • Windows operating system • Linux operating system • Macintosh operating system
Computer problem	<p><i>May include but not limited to:</i></p> <ul style="list-style-type: none"> • Software related problem <ul style="list-style-type: none"> ○ Software conflict ○ Compatibility issues ○ Software installation problem



	<ul style="list-style-type: none"> ○ Software loading problem ○ Booting issues ○ BIOS problems ○ Windows issues ○ System startup, hang, restart and shutdown issues ○ System file missing ○ Corrupt system files and driver ○ Virus and malware problems ○ Windows registry ○ Windows user security ○ Outdated software ○ Slow downloading and uploading ● Hardware related problem <ul style="list-style-type: none"> ○ Assembling ○ Upgrading ○ System boot, startup and restart problem ○ Computer components failure ○ SMPS problem ○ Continuity issues ○ Voltage and power issues
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<p>Specific location</p>	<p><i>May include but not limited to:</i></p> <ul style="list-style-type: none"> ● Local drive ● External hard drive ● USB disk ● Optical disk ● Network drive
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	<ul style="list-style-type: none"> • Cloud
Software issues resolving technique	<p><i>May include but not limited to:</i></p> <ul style="list-style-type: none"> • Uninstalling and installing software • Updating software • Configuring software/device driver • Changing configuration or setting • Roll back recent changes • Reverting system to previous restore point • Troubleshoot and repair • Boot via safe mode • Troubleshoot by using command prompt/terminal
3R's principle	<p><i>May include but not limited to:</i></p> <ul style="list-style-type: none"> • Reduce • Reuse • Recycle



5	Unit No: 2		Unit code:		
	Unit Title: Setup and configure computer network				
	Elements of competency			Performance standards	
	2.1 Prepare network components			2.1.1 Personal protective equipment (PPE) used in accordance with task requirement. 2.1.2 Network components collected as per client's requirement or network design. 2.1.3 Network components checked for physical damage. 2.1.4 Network patch cables prepared as per the task requirement.	
	2.2 Setup physical network			2.2.1 Network cables laid, crimped and tested as per cabling standard . 2.2.2 Faceplate and module crimped and installed. 2.2.3 Network devices installed and connected as per network design. 2.2.4 Network connectivity checked from each computer.	
	2.3 Configure network devices			2.3.1 Network device accessed as per manufacture's instruction. 2.3.2 Network devices configured as per client's network requirement . 2.3.3 Network and internet connection tested from each computer.	
2.4 Configure network		2.4.1 Unique and meaningful device name set to identify on a network. 2.4.2 Unique IP address assigned to each device. 2.4.3 Subnet mask, default gateway and DNS set as per requirement. 2.4.4 Internet connection shared with network computer. 2.4.5 Network and internet connection tested for connectivity.			
2.5 Manage user accounts and groups		2.5.1 User accounts and groups created with meaningful name. 2.5.2 User account added in relevant group. 2.5.3 Privilege and permission assigned to groups and users. 2.5.4 User account tested as per assigned permissions. 2.5.5 User account and group modified/updated/deleted as per the task requirement.			



	2.6 Share resources	2.6.1 Folders/file shared to specific user/group with required permission in the network. 2.6.2 Network drive mapped to users PC. 2.6.3 Shared files retrieved from assigned user as per the permission. 2.6.4 Files and folder created on mapped network drive. 2.6.5 Printer shared and accessed in the network. 2.6.6 Disk quota set and shared the drive to specific user/group with warning level.
6	Task Performance Requirements (Tools, Equipment and Materials): <ul style="list-style-type: none"> • Computer, internet connectivity, router, switch, wireless access point, media converter, ADSL/DSL modem, ethernet card, RJ45, network cable, network modular, faceplate, patch panel, patch cord, network punch down tool, network cable tester, crimping tool, screwdriver, pliers, phase tester, cable raceway/duct, printer, paper and Personal Protective Equipment (PPE). 	
7	Safety and Hygiene (Occupational Health and Safety): <ul style="list-style-type: none"> • Apply Personal Protective Equipment (PPE). • Prevent from electric shock. • Avoid awkward position. • Adjust posture to reduce strain. 	



8	Required Knowledge		
	Technical Knowledge	Applied Calculation	Graphical Information
	<ul style="list-style-type: none"> • Network tools, components and materials <ul style="list-style-type: none"> ○ Introduction ○ Types ○ Specification ○ Safe handling • Computer network <ul style="list-style-type: none"> ○ Introduction ○ Types ○ Internet ○ Advantages of computer network ○ Network topology ○ Network protocol and network standard • Client server architecture • Network device and media • Network device configuration • Network commands • IP concept 		<ul style="list-style-type: none"> • Read and interpret manufacturer's manual/specification • Read and interpret error message and code • Read and interpret network design



	<ul style="list-style-type: none"> • TCP/IP and OSI layer • Cabling standards • Resource sharing • Permission and privilege • Remote connection • VPN and its types • ISP 		
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9	Assessment of Competency					
Unit: 2 Unit Title: Setup and configure computer network						
Candidate Details			Assessors Detail			
Candidate's Name:			Assessors' Name		ID/License No:	
Registration Number:			1.			
Symbol No:			2.			
Test Centre:			3.			
Test Date:						
Element of competency	Performance Standards		Standard Met	Standard Not Met	Evidence Type	Comments
2.1 Prepare network components	2.1.1 Personal protective equipment (PPE) used in accordance with task requirement.					
	2.1.2 Network components collected as per client's requirement or network design.					
	2.1.3 Network components checked for physical damage.					
	2.1.4 Network patch cables prepared as per the task requirement.					
2.2 Setup physical network	2.2.1 Network cables laid, crimped and tested as per cabling standard .					
	2.2.2 Faceplate and module crimped and installed.					
	2.2.3 Network devices installed and connected as per network design.					
	2.2.4 Network connectivity checked from each computer.					
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<p>2.3 Configure network devices</p>	<p>2.3.1 Network device accessed as per manufacture's instruction.</p> <p>2.3.2 Network devices configured as per client's network requirement.</p> <p>2.3.3 Network and internet connection tested from each computer.</p>				
<p>2.4 Configure network</p>	<p>2.4.1 Unique and meaningful device name set to identify on a network.</p> <p>2.4.2 Unique IP address assigned to each device.</p> <p>2.4.3 Subnet mask, default gateway and DNS set as per requirement.</p> <p>2.4.4 Internet connection shared with network computer.</p> <p>2.4.5 Network and internet connection tested for connectivity.</p>				
<p>2.5 Manage user accounts and groups</p>	<p>2.5.1 User accounts and groups created with meaningful name.</p> <p>2.5.2 User account added in relevant group.</p> <p>2.5.3 Privilege and permission assigned to groups and users.</p> <p>2.5.4 User account tested as per assigned permissions.</p> <p>2.5.5 User account and group modified/updated/deleted as per the task requirement.</p>				
<p>2.6 Share resources</p>	<p>2.6.1 Folders/file shared to specific user/group with required permission in the network.</p> <p>2.6.2 Network drive mapped to users PC.</p> <p>2.6.3 Shared files retrieved from assigned user as per the permission.</p> <p>2.6.4 Files and folder created on mapped network drive.</p>				



	2.6.5 Printer shared and accessed in the network.				
	2.6.6 Disk quota set and shared the drive to specific user/group with warning level.				

WT- Written Test

OQ- Oral Question

PT- Practical Test

DO – Direct Observation

SR- Supervisor’s report

SN–Simulation

RP- Role Play

PG –Photographs

VD- Video

CT – Certificates

TS – Testimonials (Reward)

PP – Product Produced

CS – Case Study



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Range Statement

Variable	Range
Personal protective equipment	<p><i>May include but not limited to:</i></p> <ul style="list-style-type: none"> • Goggles • Apron • Gloves • Antistatic suits • Shoes
Cabling standard	<p><i>May include but not limited to:</i></p> <ul style="list-style-type: none"> • T568A, T568B • Straight cabling • Crossover cabling
Network device	<p><i>May include but not limited to:</i></p> <ul style="list-style-type: none"> • Router • Wireless access point/repeater • Network switch • Media converter
Network requirement	<p><i>May include but are not limited to:</i></p> <ul style="list-style-type: none"> • User authentication • Access control • Device security



	<ul style="list-style-type: none"> • SSID • MAC filtering • Security types • Password reset • Static and dynamic IP • Router's default IP
Network resources	<p><i>May include but are not limited to:</i></p> <ul style="list-style-type: none"> • Shared directory and file • Network printer • Mapped Network drive



5	Unit No: 3 Unit Title: Perform installation and basic configuration of windows server operating system		Unit code:		
	Elements of competency		Performance standards		
	3.1 Prepare installer		3.1.1 Required version of windows server downloaded from official page. 3.1.2 Bootable media with windows server operating system created. 3.1.3 License key collected for installation.		
	3.2 Install windows server operating system		3.2.1 BIOS configured as per the system requirement. 3.2.2 Minimum system requirement and compatibility checked against operating system. 3.2.3 Bootable OS media inserted as per BIOS mode . 3.2.4 Operating system installed as per installation guide. 3.2.5 Device drivers installed for unidentified device. 3.2.6 Disk partitions managed as per client's requirement. 3.2.7 Application and utility software installed as per installation guide. 3.2.8 Remote desktop protocol (RDP) enabled to connect with remote computer.		
	3.3 Configure network		3.3.1 Physical network connection established as per the client' requirement. 3.3.2 Unique and meaningful device name set to identify on a network. 3.3.3 Unique IP address assigned to each device. 3.3.4 Subnet mask, default gateway and DNS set as per network requirement. 3.3.5 Network configuration tested to check the connectivity.		
	3.4 Manage user accounts and groups		3.4.1 User account and groups created with meaningful name. 3.4.2 User account added in relevant group. 3.4.3 Privilege and permission assigned to the groups and user. 3.4.4 User account tested as per assigned permissions. 3.4.5 User account and group modified/updated/deleted as per the task requirement.		
	3.5 Share resources		3.5.1 Folders/file shared to specific user/group with required permission in the network. 3.5.2 Network drive mapped to users PC.		



		3.5.3 Shared files retrieved from assigned user as per the permission.
		3.5.4 Files and folders created on mapped network drive.
		3.5.5 Printer shared and accessed in the network.
	3.6 Setup remote desktop	3.6.1 Remote desktop enabled on the PC that you want to connect.
		3.6.2 Connection established with remote PC.
6	Task Performance Requirements (Tools, Equipment and Materials): <ul style="list-style-type: none"> • Computer, bootable media, device driver, application software, utility software, printer, extension cord, router, switch, network patch cable, network tester, crimping tools, RJ 45, network cable, screw drivers, phase tester and Personal Protective Equipment (PPE). 	
7	Safety and Hygiene (Occupational Health and Safety): <ul style="list-style-type: none"> • Apply Personal Protective Equipment (PPE). • Prevent from electric shock. • Avoid awkward position. • Adjust posture to reduce strain. 	



8	Required Knowledge		
	Technical Knowledge	Applied Calculation	Graphical Information
	<ul style="list-style-type: none"> • Network tools, components and materials <ul style="list-style-type: none"> ○ Introduction ○ Types ○ Safe handling • Operating system <ul style="list-style-type: none"> ○ Introduction ○ Types ○ Function • Windows server operating system <ul style="list-style-type: none"> ○ Introduction ○ Versions ○ Role and function ○ Hardware requirements ○ Installation procedures • Client server architecture • Workgroup and domain • Hard disk partition and partition tools 		<ul style="list-style-type: none"> • Read and interpret instruction manual • Read and interpret network design • Read and interpret IP configuration



	<ul style="list-style-type: none"> • Dual/multi booting • Concept of virtualization • Virtual machine • Network and IP configuration <ul style="list-style-type: none"> ○ TCP ○ Static and Dynamic IP ○ Subnet mask ○ Gateway ○ DNS ○ Network testing • Resource sharing • Group policy and services • User access control and permission • User accounts and groups • Network security • IT policy • Introduction to cyber law 		
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9	Assessment of Competency					
Unit: 3 Unit Title: Perform installation and basic configuration of windows server operating system						
Candidate Details			Assessors Detail			
Candidate's Name:			Assessors' Name		ID/License No:	
Registration Number:			1.			
Symbol No:			2.			
Test Centre:			3.			
Test Date:						
Element of competency	Performance Standards		Standard Met	Standard Not Met	Evidence Type	Comments
3.1 Prepare installer	3.1.1 Required version of windows server downloaded from official page.					
	3.1.2 Bootable media with windows server operating system created.					
	3.1.3 License key collected for installation.					
3.2 Install windows server operating system	3.2.1 BIOS configured as per the system requirement.					
	3.2.2 Minimum system requirement and compatibility checked against operating system.					
	3.2.3 Bootable OS media inserted as per BIOS mode .					
	3.2.4 Operating system installed as per installation guide.					
	3.2.5 Device drivers installed for unidentified device.					
	3.2.6 Disk partitions managed as per client's requirement.					
	3.2.7 Application and utility software installed as per installation guide.					



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	3.2.8 Remote desktop protocol (RDP) enabled to connect with remote computer.				
3.3 Configure network	3.3.1 Physical network connection established as per the client' requirement. 3.3.2 Unique and meaningful device name set to identify on a network. 3.3.3 Unique IP address assigned to each device. 3.3.4 Subnet mask, default gateway and DNS set as per network requirement. 3.3.5 Network configuration tested to check the connectivity.				
3.4 Manage user accounts and groups	3.4.1 User account and groups created with meaningful name. 3.4.2 User account added in relevant group. 3.4.3 Privilege and permission assigned to the groups and user. 3.4.4 User account tested as per assigned permissions. 3.4.5 User account and group modified/updated/deleted as per the task requirement.				
3.5 Share resources	3.5.1 Folders/file shared to specific user/group with required permission in the network. 3.5.2 Network drive mapped to users PC. 3.5.3 Shared files retrieved from assigned user as per the permission. 3.5.4 Files and folders created on mapped network drive. 3.5.5 Printer shared and accessed in the network.				
3.6 Setup remote desktop	3.6.1 Remote desktop enabled on the PC that you want to connect. 3.6.2 Connection established with remote PC.				



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PP – Product Produced

CS – Case Study



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Range Statement

Variable	Range
Media	<p><i>May include but not limited to:</i></p> <ul style="list-style-type: none"> • Pen drive • Optical disc • External hard disk drive
BIOS mode	<p><i>May include but not limited to:</i></p> <ul style="list-style-type: none"> • Legacy BIOS • UEFI BIOS
Device drivers	<p><i>May include but not limited to:</i></p> <ul style="list-style-type: none"> • Motherboard driver • Interface card driver • Printer driver • Scanner driver
Disk partitions	<p><i>May include but not limited to:</i></p> <ul style="list-style-type: none"> • Create • Shrink • Extend • Delete



<p>Application and utility software</p>	<p><i>May include but not limited to:</i></p> <ul style="list-style-type: none"> • Antivirus • Browsers • Data backup tools • Network application software
<p>Permission</p>	<p><i>May include but not limited to:</i></p> <ul style="list-style-type: none"> • Full control • Modify • Read and execute • List folder contents • Read • Write



5	Unit No: 4 Unit Title: Perform installation and basic configuration of Linux server operating system		Unit code:		
	Elements of competency		Performance standards		
	4.1 Prepare installer		4.1.1 Required Linux versions of distribution downloaded from official page.		
			4.1.2 Bootable media with Linux server operating system created.		
	4.2 Install Linux server operating system		4.2.1 BIOS configured as per the system requirement.		
			4.2.2 Minimum system requirement and compatibility checked against operating system.		
			4.2.3 Bootable OS media inserted as per BIOS mode .		
		4.2.4 Operating system installed as per installation guide.			
		4.2.5 Device drivers installed for required device.			
		4.2.6 Application and utility software installed as per installation guide.			
		4.2.7 Secure shell (SSH) enabled and started to connect with remote computer.			
4.3 Configure network		4.3.1 Physical network connection established as per the client' requirement.			
		4.3.2 Unique and meaningful host name set to identify on a network.			
		4.3.3 Unique IP address assigned to each device.			
		4.3.4 Subnet mask, default gateway and DNS set as per network requirement.			
		4.3.5 Network configuration tested to check the connectivity.			
4.4 Manage user accounts and groups		4.4.1 User accounts and groups created with meaningful name.			
		4.4.2 Users added in relevant groups.			
		4.4.3 Privilege and permission assigned to the groups and user.			
		4.4.4 User account tested as per assigned permissions.			
		4.4.5 User account and groups modified/updated/deleted as per the task requirement.			
4.5 Configure time synchronization with NTP server		4.5.1 Time zone modified according to location.			
		4.5.2 NTP configuration file edited with proper IP or hostname of NTP server to be synchronized.			
		4.5.3 NTP synchronization settings enabled.			



	4.6 Configure Samba server	4.6.1 Samba package installed. 4.6.2 Samba server enabled and started. 4.6.3 A shared directory created with required permission and ownership. 4.6.4 Samba global options configured according to the requirements. 4.6.5 User accounts and groups created and shared with required permission. 4.6.6 Firewall rules configured to allow samba. 4.6.7 Shared directory mapped/mounted to client machine.
6	Task Performance Requirements (Tools, Equipment and Materials): <ul style="list-style-type: none"> Computer, bootable media (Linux server OS), device driver, application software, utility software, printer, extension cord, router, switch, network patch cable, network tester, crimping tools, RJ 45, network cable, screw drivers, pliers, phase tester and Personal Protective Equipment (PPE). 	
7	Safety and Hygiene (Occupational Health and Safety): <ul style="list-style-type: none"> Apply Personal Protective Equipment (PPE). Prevent from electric shock. Avoid awkward position. Adjust posture to reduce strain. 	



8	Required Knowledge		
	Technical Knowledge	Applied Calculation	Graphical Information
	<ul style="list-style-type: none"> • Server operating system <ul style="list-style-type: none"> ○ Introduction ○ Types ○ Function • Linux server operating system <ul style="list-style-type: none"> ○ Introduction ○ Distribution and versions ○ Role and function ○ Hardware requirements ○ Installation procedures ○ Command Line Interface (CLI) and Graphical User Interface (GUI) ○ Directory structure • Basic linux command <ul style="list-style-type: none"> ○ System command: useradd, userdel, groupadd, groupdel, passwd, hostname, poweroff, reboot, systemctl, uname, man, infocpu, du, su, whoami, 		<ul style="list-style-type: none"> • Read and interpret instruction manual • Read and interpret network design • Read and interpret IP configuration • Read and interpret basic Linux commands



	<p>lsblk, df, clear, date, cal, chmod, chown, usermod, chage, history</p> <ul style="list-style-type: none"> ○ File management command: ls, cd, mkdir, rmdir, touch, cp, mv, rm, cat, vi, nano, grep, zip, unzip ○ Networking commands: ifconfig, ping, telnet, ssh, scp, wget ○ Process management commands: ps, top, kill <ul style="list-style-type: none"> ● Client server architecture ● Hard disk partition and partition tools ● Dual/multi booting ● Concept of virtualization ● Virtual machine ● Network and IP configuration <ul style="list-style-type: none"> ○ TCP ○ Static and Dynamic IP ○ Subnet mask ○ Gateway ○ DNS ○ Network testing ● SAMBA services 		
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	<ul style="list-style-type: none">• NTP server• Root password• User accounts and groups• Network security• Firewall• IT policy• Introduction to cyber law		
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9	Assessment of Competency					
Unit: 4 Unit Title: Perform installation and basic configuration of Linux server operating system						
Candidate Details			Assessors Detail			
Candidate's Name:			Assessors' Name		ID/License No:	
Registration Number:			1.			
Symbol No:			2.			
Test Centre:			3.			
Test Date:						
Element of competency	Performance Standards		Standard Met	Standard Not Met	Evidence Type	Comments
4.1 Prepare installer	4.1.1 Required Linux versions of distribution downloaded from official page.					
	4.1.2 Bootable media with Linux server operating system created.					
4.2 Install Linux server operating system	4.2.1 BIOS configured as per the system requirement.					
	4.2.2 Minimum system requirement and compatibility checked against operating system.					
	4.2.3 Bootable OS media inserted as per BIOS mode .					
	4.2.4 Operating system installed as per installation guide.					
	4.2.5 Device drivers installed for required device.					
	4.2.6 Application and utility software installed as per installation guide.					
	4.2.7 Secure shell (SSH) enabled and started to connect with remote computer.					



4.3 Configure network	<p>4.3.1 Physical network connection established as per the client' requirement.</p> <p>4.3.2 Unique and meaningful host name set to identify on a network.</p> <p>4.3.3 Unique IP address assigned to each device.</p> <p>4.3.4 Subnet mask, default gateway and DNS set as per network requirement.</p> <p>4.3.5 Network configuration tested to check the connectivity.</p>				
4.4 Manage user accounts and groups	<p>4.4.1 User accounts and groups created with meaningful name.</p> <p>4.4.2 Users added in relevant groups.</p> <p>4.4.3 Privilege and permission assigned to the groups and user.</p> <p>4.4.4 User account tested as per assigned permissions.</p> <p>4.4.5 User account and groups modified/updated/deleted as per the task requirement.</p>				
4.5 Configure time synchronization with NTP server	<p>4.5.1 Time zone modified according to location.</p> <p>4.5.2 NTP configuration file edited with proper IP or hostname of NTP server to be synchronized.</p> <p>4.5.3 NTP synchronization settings enabled.</p>				
4.6 Configure Samba server	<p>4.6.1 Samba package installed.</p> <p>4.6.2 Samba server enabled and started.</p> <p>4.6.3 A shared directory created with required permission and ownership.</p> <p>4.6.4 Samba global options configured according to the requirements.</p> <p>4.6.5 User accounts and groups created and shared with required permission.</p>				



	4.6.6 Firewall rules configured to allow samba.				
	4.6.7 Shared directory mapped/mounted to client machine.				

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Range Statement

Variable	Range
Linux	<p><i>May include but not limited to:</i></p> <ul style="list-style-type: none"> • Ubuntu • Red Hat Enterprise Linux (RHEL) • CentOS • Debian • Fedora • Kali • Suse • Mint
Media	<p><i>May include but not limited to:</i></p> <ul style="list-style-type: none"> • Pen drive • Optical disc • External hard disk drive
BIOS mode	<p><i>May include but not limited to:</i></p> <ul style="list-style-type: none"> • Legacy BIOS • UEFI BIOS
Device drivers	<p><i>May include but not limited to:</i></p> <ul style="list-style-type: none"> • Motherboard driver • Interface card driver



	<ul style="list-style-type: none"> • Printer driver • Scanner driver
Application and utility software	<p><i>May include but not limited to:</i></p> <ul style="list-style-type: none"> • Antivirus • Office package • Browsers • Network application software • Data backup tools
Permission	<p><i>May include but not limited to:</i></p> <ul style="list-style-type: none"> • Full control • Read • Write • Execute • No permission



5	Unit No: 5 Unit Title: Install CC camera	Unit code:	
	Elements of competency	Performance standards	
	5.1 Install CCTV	5.1.1 Client's requirement identified. 5.1.2 Surveillance area located/identified. 5.1.3 Surveillance devices checked for physical damage. 5.1.4 Hard disk mounted on DVR/NVR. 5.1.5 CCTV mounted/fixed on marked place and position adjusted. 5.1.6 Cables laid and connected to CCTV and DVR/NVR.	
	5.2 Configure CCTV	5.2.1 DVR/NVR accessed as per manufacturer's instruction. 5.2.2 Date and time set to current date and time based on time zone. 5.2.3 Recording time and quality set as per customer requirement. 5.2.4 NVR accessed through internet. 5.2.5 Backup option set.	
	5.3 Conduct test	5.3.1 Installation and configuration of CCTV and DVR/NVR tested. 5.3.2 Every camera view checked. 5.3.3 Recorded files playback and downloaded to USB drive. 5.3.4 Camera adjusted as per requirement. 5.3.5 Report prepared.	
6	Task Performance Requirements (Tools, Equipment and Materials): <ul style="list-style-type: none"> DVR/NVR, Cable (RG-59 coaxial, network cable), BNC connector, DC pin, hard drive, mouse, monitor, CCTV/IP camera, switch, network cable tester, power supply, wire cutter, nose pliers, screw driver, tape, power adapter, drilling machine and PPE. 		



7

Safety and Hygiene (Occupational Health and Safety):

- Apply Personal Protective Equipment (PPE).
- Disconnect power supply.
- Prevent from electric shock.
- Maintain proper posture (Avoid awkward position).



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8	Required Knowledge		
	Technical Knowledge	Applied Calculation	Graphical Information
	<ul style="list-style-type: none"> Physical security devices Legal issues Installation procedure Surveillance device CCTV IP camera Access control DVR/NVR Components of DVR/NVR POE switch 		<ul style="list-style-type: none"> Read and interpret manufacturer's manual/specification.



9	Assessment of Competency					
Unit: 5 Unit Title: Install CC camera						
Candidate Details			Assessors Detail			
Candidate's Name:			Assessors' Name		ID/License No:	
Registration Number:			1.			
Symbol No:			2.			
Test Centre:			3.			
Test Date:						
Element of competency	Performance Standards		Standard Met	Standard Not Met	Evidence Type	Comments
5.1 Install CCTV	5.1.1 Client's requirement identified. 5.1.2 Surveillance area located/identified. 5.1.3 Surveillance devices checked for physical damage. 5.1.4 Hard disk mounted on DVR. 5.1.5 CCTV mounted/fixed on marked place and position adjusted. 5.1.6 Cables laid and connected to CCTV and DVR/NVR.					
5.2 Configure CCTV	5.2.1 DVR/NVR accessed. 5.2.2 Date and time set. 5.2.3 Recording time and quality set as per customer requirement. 5.2.4 NVR accessed through internet. 5.2.5 Backup option set.					



5.3 Conduct test	5.3.1 Installation and configuration of CCTV and DVR/NVR tested. 5.3.2 Every camera view checked. 5.3.3 Recorded files playback and downloaded to USB drive. 5.3.4 Camera adjusted as per requirement. 5.3.5 Report prepared.				
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