

T Level Technical Qualification in Digital Support Services

Occupational specialism assessment (OSA)

Network Cabling

Assignment 2 - Pass

Guide standard exemplification materials

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Guide standard exemplification materials

Network Cabling

Assignment 2

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Introduction

The material within this document relates to the Network Cabling occupational specialism sample assessment. These exemplification materials are designed to give providers and students an indication of what would be expected for the lowest level of attainment required to achieve a pass or distinction grade.

The examiner commentary is provided to detail the judgements examiners will undertake when examining the student work. This is not intended to replace the information within the qualification specification and providers must refer to this for the content.

In assignment 2, the student must install part of the cabling system for the doctors' surgery, devise a test plan and test the cabling system.

After each live assessment series, authentic student evidence will be published with examiner commentary across the range of achievement.

Assignment 2

Scenario

You are required to provide the network data installation for a doctors' surgery based in a small, single-storey building.

The building will comprise of a reception area and 3 surgery rooms.

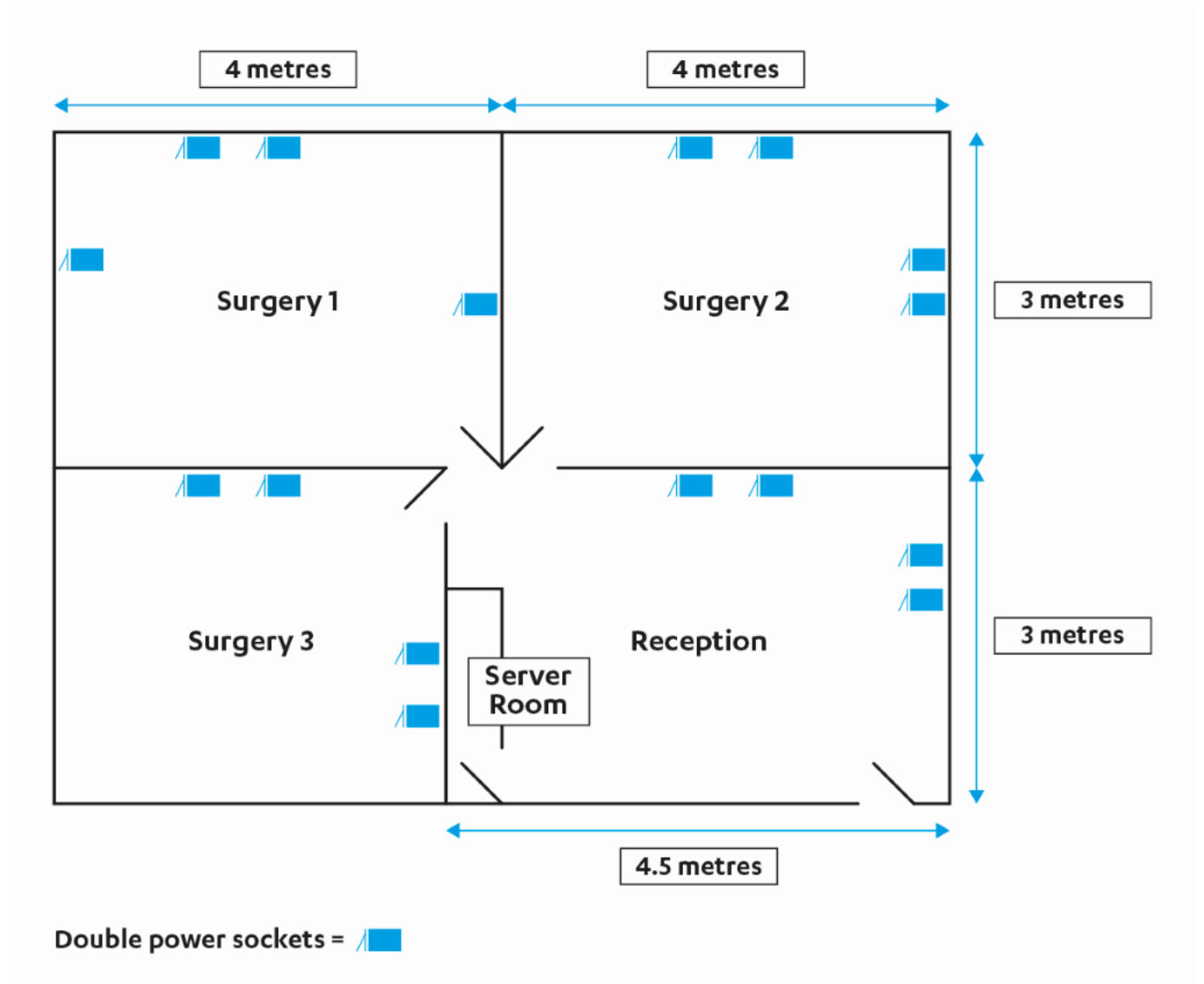
There is an ample supply of power sockets in each surgery room and the reception area.

The needs of the various users are:

- there are 6 doctors working in the practice and all will require access to the network at any time of the day
- doctors will need to be able to access digital medical records which will be stored separately from all other data
- doctors will need to be able to access the digital appointments system
- the 3 reception staff only require access to the booking system and must **not** have access to digital medical records
- the data server room will be located in the reception area
- all doctors and reception staff need access to a network printer

An outline plan of the surgery (image A) is provided on the next page.

Image A



Task 1: install the cabling system

Time limit

12 hours 30 minutes to complete task 1 and task 2

(32 marks)

You need to install part of the cabling system for the doctors' surgery, in line with the details given in the bulleted list below.

Using the components that you have been provided with, you need to create working cables and install hardware to a standard that will ensure a safe working environment for the end users:

- install 4 wall sockets fitted within trunking; this should be correctly cabled to allow successful data transmission
- the cabling system you installed in the previous point should be terminated at the patch panel and be connected to a switch
- appropriately configure DHCP
- there should also be all the necessary components to allow WiFi access with relevant security controls configured to end user devices
- appropriate application of principles of network security and implementation of a range of security controls when installing the network
- all installed equipment and ports should be labelled
- you are required to adhere to relevant health and safety standards whilst completing the installation, use the correct tools and have the correct PPE (personal protective equipment)
- end user devices capable of wired and wireless connectivity, for example, laptops

For task 1 and task 2 you will have access to the following equipment:

- word processing software
- digital camera
- network cabling
- a supply of RJ45 connectors
- trunking
- wall outlet sockets
- crimper tools
- cable tester
- patch panel
- network switch
- router
- wireless access points (WAPs)

- labelling machine
- appropriate end user devices for testing

Evidence required for submission to NCFE

Photographic evidence of the following, in .pdf format:

- raw materials
- completed cables meeting standard T-568B
- completed wall outlet sockets, including correct labelling
- wall outlet sockets successfully housed in trunking and fixed securely to work area
- cables terminated at the patch panel meeting standard T-568B
- WiFi access configuration settings showing encryption standards used
- safe working environment and PPE to be utilised
- accurate labelling for all components in the installation

Student evidence

PPE:



While installing the cables I will need PPE (personal protective equipment) including eye protectors, gloves and boots.

Tools:

These are the tools I will need including a cable tester, crimping tool and “push down” tool.



I will also need a label printer and a saw.



Hardware:



I will be using UTP cable.



This is the trunking that will be used.



Patch panels



Wall plates

Networking equipment:

Network switch



Wireless access point





I install the trunking - this is to protect the cables from people pulling them.



Here I am installing the wall plates into the trunking.



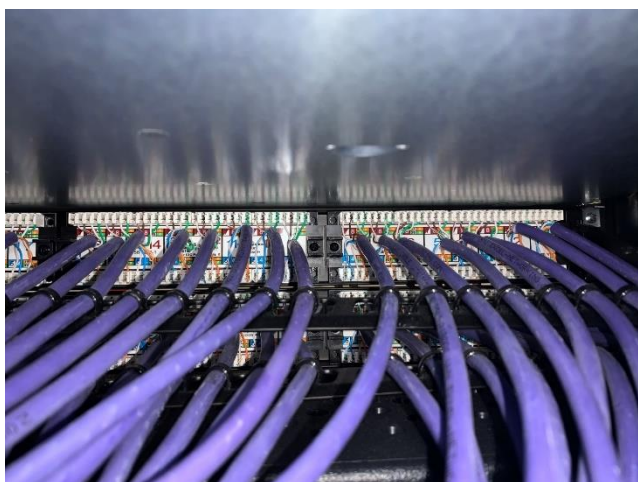
Cables (purple) are now in the trunking.

Installing the equipment:

Patch panel:



I install the patch panels into the server rack – this makes it look neater.



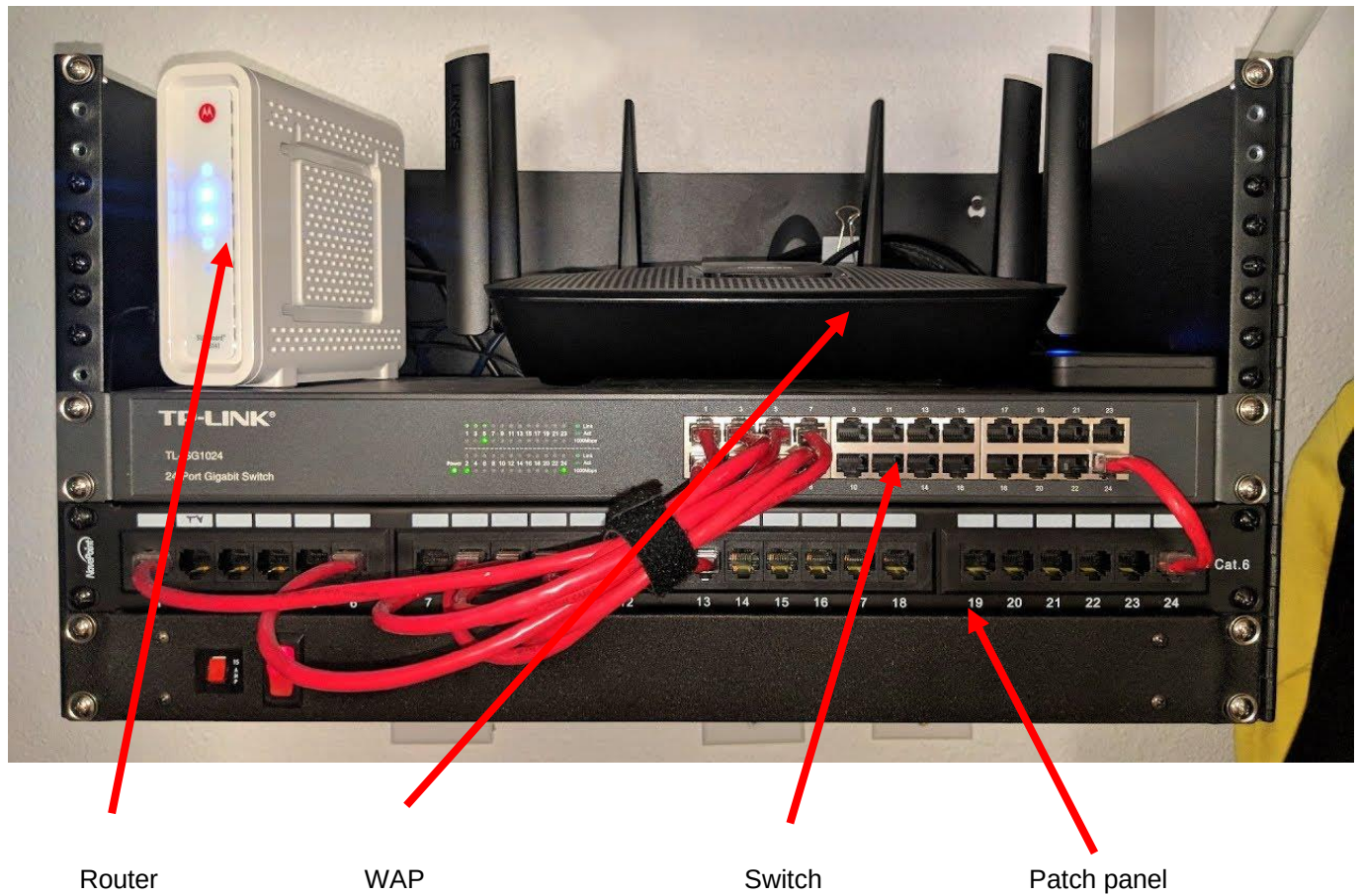
All ports correctly terminated at a T-568B standard at the port end and the patch panel end.



Cables are now tested using a cable tester.

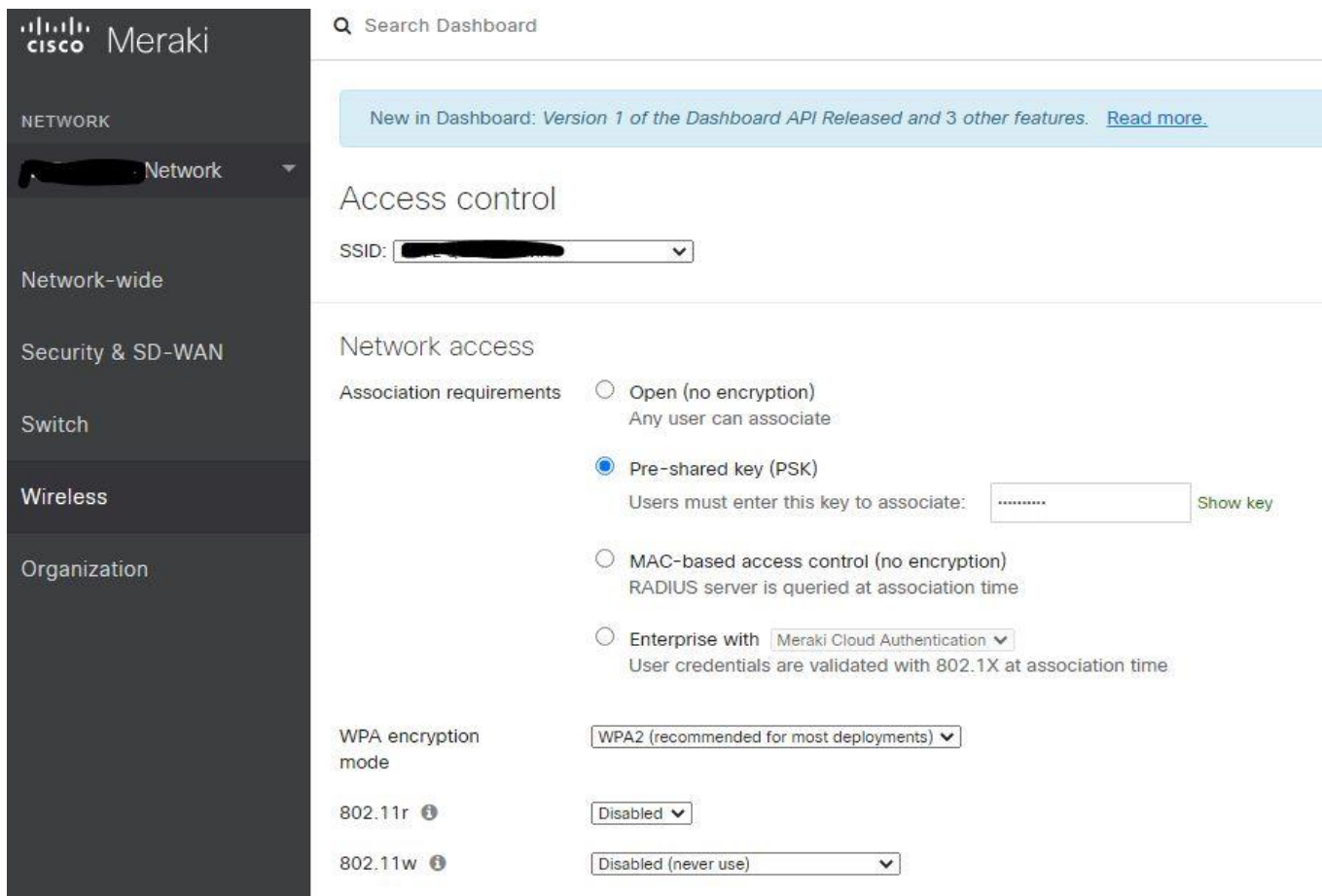


And then labelled at both ends so that I can ensure that I know what goes where.

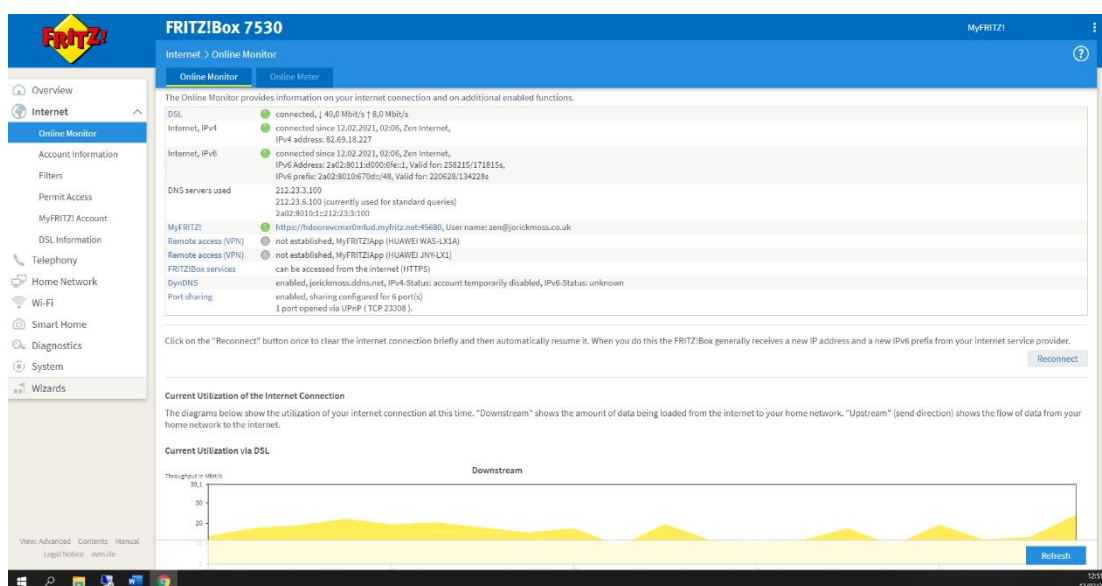


Here you can see the patch panel, switch, router and wireless access point all installed and patched together.

WiFi strong configuration:



Screenshot of the WiFi configuration: showing the use of WPA2-PSK and a complex network key.



Here you can see the router is now connected to the internet:

The screenshot shows the FRITZ!Box 7530 web interface. The left sidebar contains navigation links: Overview, Internet, Telephony, Home Network (selected), Mesh, Network, USB / Storage, Media Server, FRITZ!Box Name, Wi-Fi, Smart Home, Diagnostics, System, and Wizards. The main content area is titled 'IPv4 Addresses' and includes a warning about the importance of the IPv4 address. The 'Home Network' section shows the following configuration:

Field	Value
IPv4 address	192 . 168 . 0 . 1
Subnet mask	255 . 255 . 255 . 0
Enable DHCP server	☒
DHCP server assigns IPv4 addresses	
from	192 . 168 . 0 . 51
to	192 . 168 . 0 . 150
Valid for	4 days
Local DNS server	192 . 168 . 0 . 1

Here you can see that I have configured the DHCP server to use a 192.168.0.0/24 network.

ProCurve Networking
HP Innovation



Link Status:
■ - Up
■ - Down

SYSTEM

PORTS

Configuration

Port Mirroring

Statistics

TRUNKS

VLANS

LLDP

SNMP

DIAGNOSTICS

SUPPORT

LOGOUT

Port Mirroring

This page enables you to set up the port mirroring features of the switch to enable traffic monitoring.

Port to Mirror to

Port to Mirror to 8 ▼

Ports to Mirror

Port	Mirroring Enabled	Port	Mirroring Enabled
1	☒	5	☒
2	☒	6	☒
3	☒	7	☒
4	☒	8	☐

HELP

APPLY

CANCEL

Here is the configuration page for the switch.

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Task 2: devise a test plan and test the cabling system

Time limit

12 hours 30 minutes to complete task 1 and task 2

(12 marks)

To provide confidence that the cabling you have installed gives the data transmission capability desired by users, you are required to:

- use a cable tester to check for the successful connectivity and connection speed in all cables and infrastructure you have installed, in accordance with TIA/EIA 568B standards
- ensure successful communication between end devices through wired and wireless connectivity
- troubleshoot any issues encountered, such as latency, jitter, cross talk, media standard compatibility (for example, 1000BASE-T) and any other connection issues. If no issues are found this should still be documented in your test plan
- appropriately test all implemented network security controls
- document the results - connection results should be cross-referenced to devices and media given in the scenario with information relating to the security controls that have been configured
- suggest any appropriate recommendations you feel would improve network security
- use the test plan template provided

Evidence required for submission to NCFE

Completed test results (using provided test plan template) which cover the complete installation and have fully relevant solutions or recommendations to any issues identified, in .pdf format.

Screenshots or photographs of all tests carried out, in .pdf format - these must be cross-referenced to a test in the test plan template.

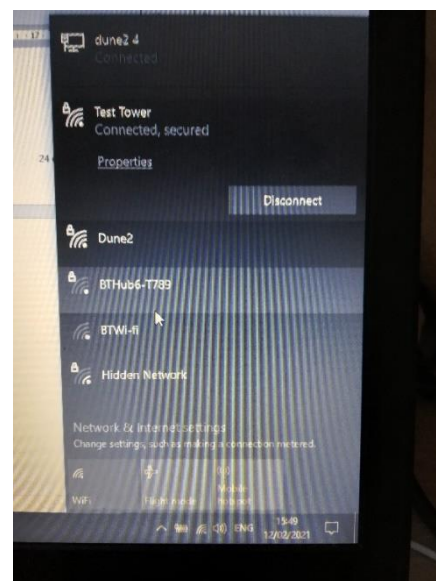
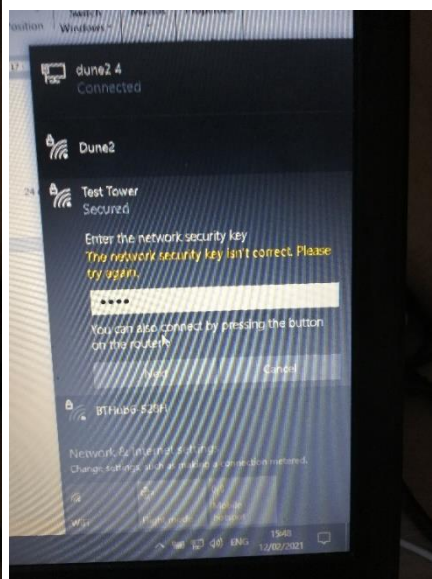
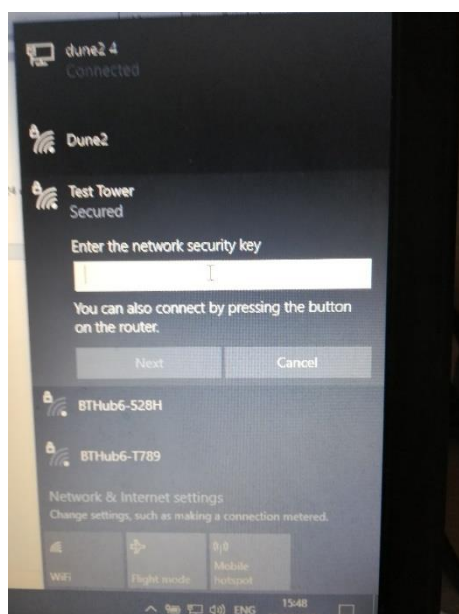
Student evidence

What is being tested?	How is it to be tested?	Expected outcome	Actual outcome	Solution	Remarks
Wireless password	Try to connect with correct password	Allowed on wireless	Could not get connected	Reset password	Either a character was invalid or it was originally spelt incorrectly during the configuration
IP addressing	Check IP configuration on device	IP address and subnet mask set to an expected value	Device received the expected details	N/A	N/A
Testing wireless speed and connectivity	Connect a device to the wireless network	Successful connection to a device and to average close to 1Gbps	Device connected and file transfer speeds averaged the expected speeds	N/A	This worked once the wireless password was fixed
Testing wired speed and connectivity	Connect a device to the wired network	Successful connection to a device and to average close to 1Gbps	Device connected and file transfer speeds averaged the expected speeds	N/A	N/A
Testing each wall port to its patch panel port	Using a network tester at each wall port to test the connection to the adjacent patch panel port	Each cable to report a successful connection	Port 1 - success Port 2- success Port 3 - failed Port 4 - failed	Port 3 - faulty cable had to be totally replaced Port 4 - re-terminated	Port 3 had no obvious failure in the termination or obvious damage to the cable, assume there is an unseen fault within the cable

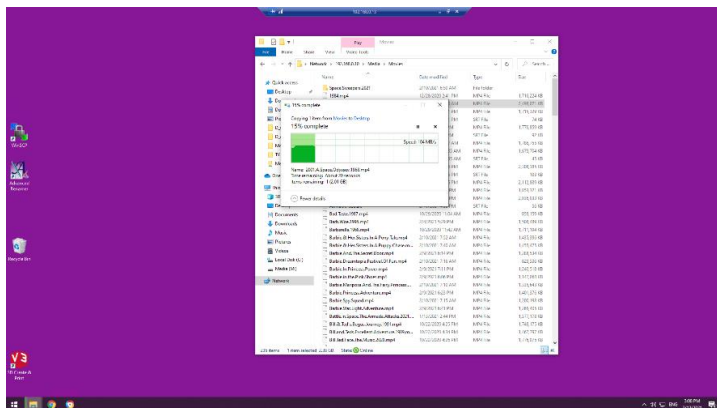
What is being tested?	How is it to be tested?	Expected outcome	Actual outcome	Solution	Remarks
Test password on switch	Ensure the expected password allows logon	Successful login	Login was successful	N/A	The password could be made more complex and telnet could be disabled and only SSH allowed which is more secure

Below are the screenshots/photos for each test.

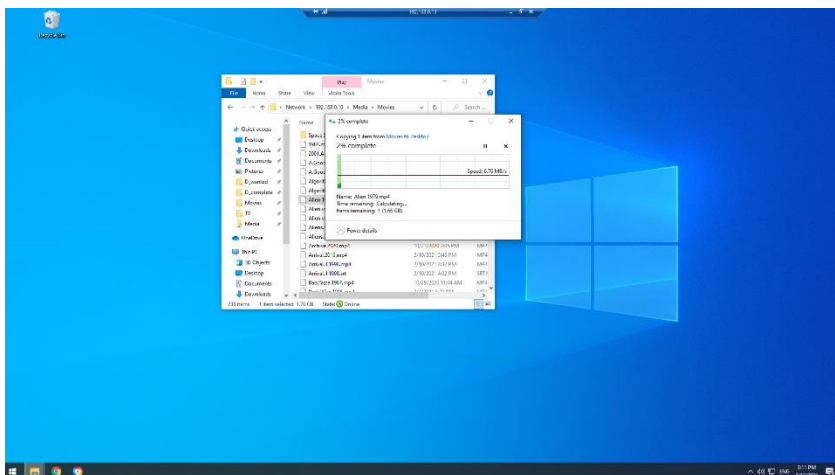
Test: Wireless password



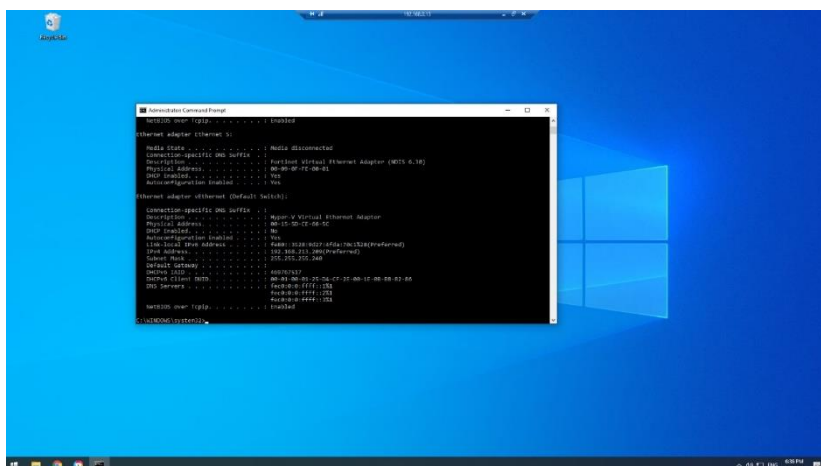
IP Addressing

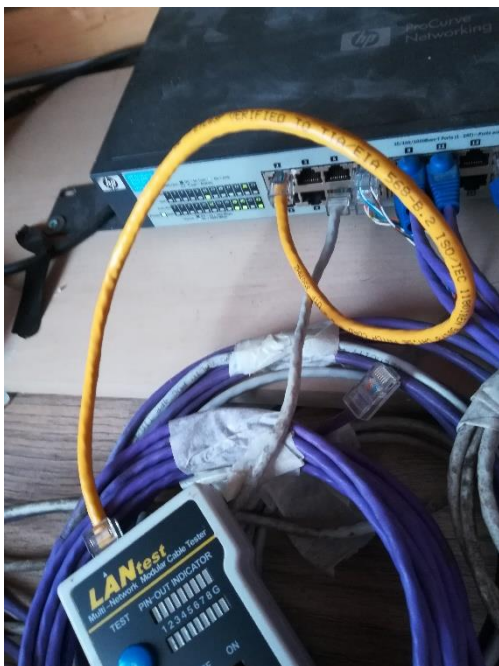


Testing wireless speed and connectivity



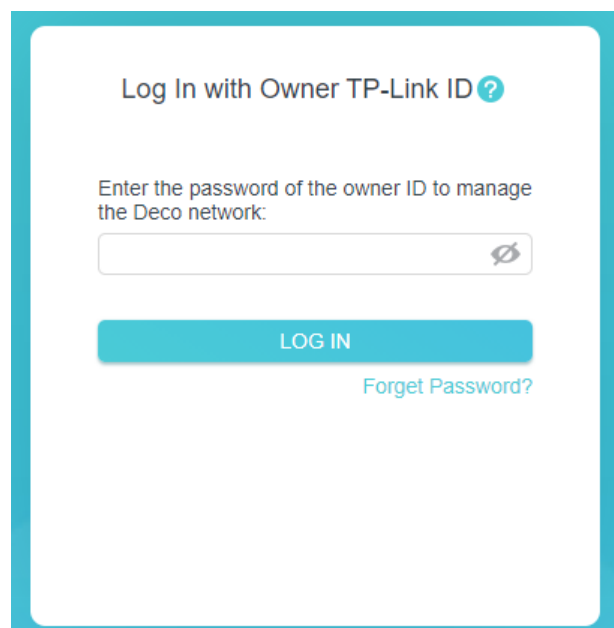
Testing wired speed and connectivity





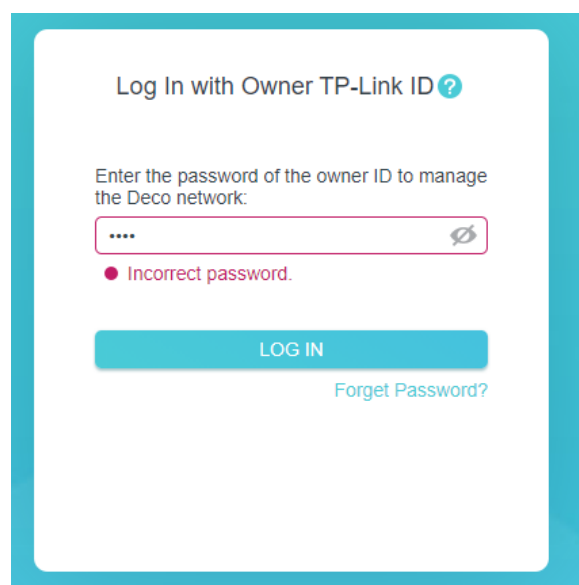
Testing each wall port to its patch panel port

Test password on switch



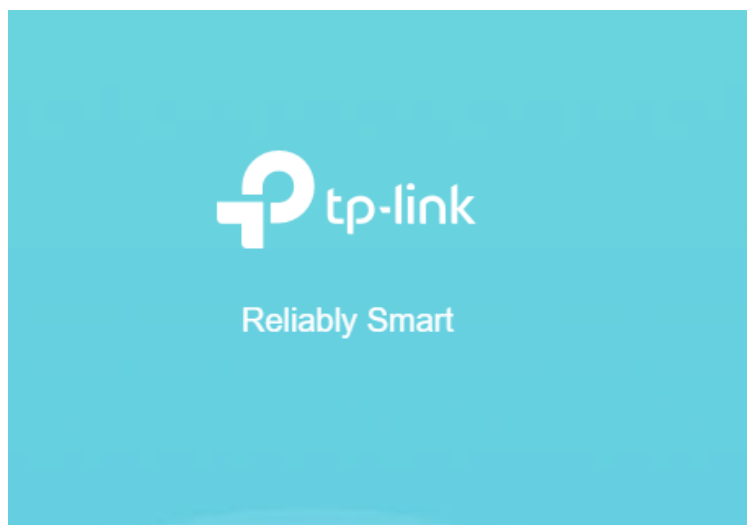
The image shows a login screen for a TP-Link Deco network. It has a light blue border. At the top, it says "Log In with Owner TP-Link ID" with a question mark icon. Below that, it says "Enter the password of the owner ID to manage the Deco network:". There is a white password input field with a toggle icon on the right. Below the field is a blue "LOG IN" button. To the right of the button is a link that says "Forget Password?".

Login screen for switch



The image shows the same login screen as above, but with an error message. The password input field now contains four dots. Below the field, there is a red dot followed by the text "Incorrect password.". The "LOG IN" button and the "Forget Password?" link are still present.

This is what happens when you enter the wrong password.



Should you enter the correct password it will show you the splash screen and then take you in to the configuration.

Assignment 2

Examiner commentary

The student has provided all required pieces of evidence. The physical network also works but might not be of a high build standard. This may not allow for flexibility or upgradability in the future.

The testing table is clear, and the tests are appropriate; however, there is a lack of some areas being tested which, although not vital, would have shown further consideration to the performance on of the network. Suggestions for improvement are present but limited.

Overall grade descriptors

The performance outcomes form the basis of the overall grading descriptors for pass and distinction grades.

These grading descriptors have been developed to reflect the appropriate level of demand for students of other level 3 qualifications, the threshold competence requirements of the role and have been validated with employers within the sector to describe achievement appropriate to the role.

Occupational specialism overall grade descriptors:

Grade	Demonstration of attainment
Distinction	The evidence is logical and provides an excellent response to the demands of the brief
	Makes use of relevant knowledge and is well-informed by the practices of the sector
	Demonstrates an understanding of the different perspectives/approaches associated within the sector
	Makes excellent use of facts/theories/approaches/concepts
	Demonstrates comprehensive use of breadth and depth of knowledge and understanding
	Consistently selects appropriate skills/techniques/methods
	Identifies information from a range of suitable sources and makes use of appropriate information/ appraises relevancy of information
	Combines information to make accurate and appropriate decisions
	Makes sound judgements/takes appropriate action/seeking clarification and guidance
	Successfully tackles both routine and non-routine problems that reflect real life situations in the sector
	Effectively demonstrates skills and knowledge of the relevant concepts and techniques reflected in the sector and is applied across a variety of contexts

Grade	Demonstration of attainment
	Tackles unstructured problems that have not been seen before, using their knowledge to analyse and find suitable solutions to the problems
	Analyses data/information in context and applies appropriate analysis in confirming or refuting conclusions and carrying out further work to evaluate conclusions
	Justifies strategies for solving problems, giving clear explanations for their reasoning
Pass	The evidence is logical and a good response to the demands of the brief
	Makes use of relevant knowledge and is generally informed by the practices of the sector
	Demonstrates an understanding of some perspectives or approaches associated within the sector
	Makes good use of facts/theories/approaches/concepts
	Demonstrates breadth and depth of knowledge and understanding
	Generally selects appropriate skills/techniques/methods
	Identifies information from appropriate sources
	Makes use of appropriate information/appraises relevancy of information
	Combines information to make accurate decisions
	Makes generally sound judgements/takes appropriate action/seek clarification and guidance
	Able to successfully tackle routine problems and make some progress on solving non-routine problems in real life situations
	Demonstrates most skills and knowledge of the relevant concepts and techniques reflected in the sector and is applied across different contexts
	Able to make some progress on unstructured problems that have not been seen before, using their knowledge to find solutions to problems
	Makes some justification for strategies for solving problems, giving explanations for their reasoning

* “Threshold competence” refers to a level of competence that:

- signifies that a student is well placed to develop full occupational competence, with further support and development, once in employment

- is as close to full occupational competence as can be reasonably expected of a student studying the TQ in a classroom-based setting (for example, in the classroom, workshops, simulated working and (where appropriate) supervised working environments)
- signifies that a student has achieved the level for a pass in relation to the relevant occupational specialism component

U grades

- if a student is not successful in reaching the minimum threshold for the core and/or occupational specialism component, they will be issued with a U grade

Document information

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Owner: Head of Assessment Design

Change History Record

Version	Description of change	Approval	Date of Issue
v1.0	Published final version.		May 2021
v1.1	NCFE rebrand		September 2021