



**Llenwch, plygwch a seliwch
(gweler nodyn 2 isod)**

Roberts

A law

Ffransis

Cyfarwyddiadau i Ymgeiswyr

1. Rhewch yr holl wybodaeth y gofynnir amdani yn y blychau isod.
2. Rhewch eich enw yn y lle a ddarparwyd ar y dde, plygwch ef a'i selio i lawr (gan ddefnyddio'r label a ddarparwyd) i guddio'ch enw.
3. Rhaid i'r atebion fod mewn llawysgrifen ddarllenadwy. Gall yr Arholwyr naill ai anwybyddu sgrïpt annarllenadwy, neu drefnu iddi gael ei theipio a chael yr ymgeisydd i dalu.
4. Ysgrifennwch eich atebion mewn inc.
5. Dechreuwch bob ateb ar dudalen newydd. Gwnewch unrhyw fras nodiadau yn y llyfr atebion a thynnu llinell drwyddynt.
6. Ni ddylid rhwygo unrhyw ran o'r llyfr hwn; rhaid ei gyflwyno yn gyfan.
7. Os defnyddir mwy nag un llyfr, rhwymwch hwy gyda'i gilydd gan ddefnyddio'r tagiau sydd ar gael oddi wrth y gwyliwr/gwylwyr.
8. Rhaid dychwelyd pob llyfr. Ni chaniateir mynd â llyfrau atebion, wedi eu defnyddio neu heb eu defnyddio, allan o'r lleoliad arholi o dan unrhyw amgylchiadau.

1	Rhif Myfyriwr	11860
2	Teitl y Papur Arholiad	Networking and Cyber Security Essential
3	Cod y Modwl	ACCA4024
4	Dyddiad ac Amser yr Archoliad	16th May 2022
5	Lleoliad yr Arholiad	
6	Rhif Sedd	
7	Nifer y Llyfrau Atebion a gyflwynwyd	

[illegible]

(See the other side for English version)

Question one

i)

B. RFID ✓ (3)

ii)

A Application X.

iii)

A. 1522 bytes X.

iv)

B Yes, the network is having the required usable hosts. X.

v)

A. True ✓ (3)

* note - you missed out Q vii X.

viii)

B. False ✓ (3)

ix)

A. True ✓ (2)

x)

A. True X.

Q1 - 11.

Question Two

The OSI Model was created as a theoretical model as a reference to be used to help people understand how the network operates. ✓①

The OSI Model has 7 layers
These are:

7 Application - this layer is where users can access the network and where applications can access the network. (SMTP, FTP, TELNET) ✓①

6 Presentation - This is where data is translated being formatted so that it is in a usable format. This is also where encryption occurs. ✓①

5 Session - Stop, Start Maintains connections, controlling of ports and sessions. ✓①

4 Transport - Transmission of Data is sent through the network using protocols such as TCP, UDP and ports. ✓①

3 Network - Data is sent through the network, ^{which} physical path the data takes. (IP addresses, Routers Modems) ✓①

2 Data link - transmission of data packets are sent through the Network (MAC Addresses, switches) ✓①

1. Physical -

✓ ①

Cables NIC cards, Hubs

The TCP/IP model is used in the real world to be able to understand the network where issues come up in IT which needs to be solved. The 5 layers are: ①

5. Application ✓

4. Transport ✓

3. Network ✓

2. Data Link ✓ ①

1. Physical ✓

It is used to be able to go through each of these layers/steps to find out where are the problems within the network. ①

There are differences between the OSI and TCP/IP Model.

The OSI Model is not reliable to be used compared with the TCP/IP model. The OSI follows a vertical approach whereas the TCP/IP follows a horizontal approach. ①

The TCP/IP model was created after the protocols were created. ①

The OSI Model was created before the protocols themselves

The OSI Model has strict boundaries in place and the TCP/IP model does not have strict boundaries.

The layers presentation and session are combined into the ①

application layer in the ~~OSI~~ TCP/IP Model. The OSI Model have the layers application and session separate to the layer application and this is why it has these two extra layer making 7 layer rather than the five layers, the TCP/IP has.

Q2 total - 16.

Question Three

- IP addresses uniquely define a device on the internet. ✓ ①
IP addresses are a logical address. IP addresses can change with time and environment. ✓ ①
- The third layer of the OSI Model is responsible for IP addresses. ✓ ①
- The types of IP addresses are IPv4 and IPv6. ✓
IPv4 is a four byte address and IPv6 is a sixteen byte address.
IPv4 uses a 32-bit ✓ ①
IPv6 uses a 128-bit ✓ ①
IPv4 has an address format using dotted notation whereas IPv6 uses hexadecimal notations. ✓
- IPv6 has been developed because when IPv4 addresses were created they did not think that the internet would evolve and become so large. ✓ ①
There are a limited amount of public IP addresses which are IPv4 and therefore the IPv6 addressing scheme has been introduced so that we won't be running out of IP addresses which are needed all around the world. IPv6 was developed due to this weakness of the IPv4. ✓ ①

There are different classes of IP address.

For example

Class A 10.126.xxx.xxx

Class B 128-191-xxx-xxx

Class C 192-223-xxx-xxx

Different IP addresses are separated so that they can be organized.

The purpose of Network address translation is it changes / translates a set of private IP addresses to a set of public IP addresses in a network.

This was needed due to the limited amount of IPv4 addresses that are available meaning NAT allows more IP addresses/public IP addresses to be available when needed.

A MAC address is an uniquely defined address for devices on the network. It is a physical address which cannot be changed.

Its purpose is to give an unique address number for individual devices such as mobile phones, computers so that data can be transmitted / sent to the correct device on a network.

A MAC address is 6 groups of

2 digits for example 00:00:AA:AB:BB:AB

They can be separated by colons or hyphens usually colons for Linux and MAC Hyphens are used by Microsoft and Cisco uses 4 groups of 4 separated by dashes. MAC addresses are 48-bytes.

Layer two of the OSI table/Model is responsible for MAC Addresses.

There are two types of MAC addresses which are:

Dynamic and Static.

A Dynamic type can change whereas a Static MAC address cannot change. It is usually used, a static address by large businesses, corporate networks which have ~~important~~ information and servers. A dynamic is used often in home networks where dynamic addresses are used on devices such as laptops and computers.

Q3 total - 16 marks

Question 4

A hardware firewall is a physical unit which is used as the first line of defences to stop / block unauthorised access into for example your home network, business network from active threats and suspicious activity that you do not want to allow into your private network. ✓ ①

A Software firewall is an application which is built into your devices such as your computer. This would be a second line of defence if you also used a hardware firewall. ✓ ①

It helps prevent unwanted bad traffic and threats from entering through to your computer such as malware, viruses, spyware. It stops and blocks these data packets from getting through. ✓ ①

Having a Demilitarized 'zone' can help certain people e.g. large, small business for adding another layer of security. ✓ ①

It's using a physical firewall such as a hardware firewall ✓ ①

An intrusion Detection System is used to block

Q4 part A - 7 marks.

A Modem is a device that's not intelligent. It converts digital signals into analog ~~and converts~~ ^{which is sent} down the telephone line. At the other end it

converts analog signal back into digital signal which your computer can understand. It can connect one device such as a computer to the internet. A Modem is a layer 3 device

Hubs are a device which sends data to all devices in a network.

It uses a lot of bandwidth because of this. It has security issues as it sends the data to all devices which may be accessed by others within the network. Hubs are a layer 1 device. It is a non intelligent device.

Routers are intelligent devices ~~which~~ ^{which} enables users to communicate and connect to the internet.

Routers connect multiple devices to the network.

Switches are intelligent devices which replaced hubs which are an older technology.

Question 5

- i.) ~~B. ~~Auth~~ Encryption~~
A. Authentication X
- ii.) B. Encryption ✓ ②
- iii.) B. DHCP X
- iv.) C. nslookup ✓ ②
- v.) A. test the end to end connectivity between hosts.
✓ ② QS-6.

→ Switches are able to learn MAC addresses which means that they send data within a network to the correct device only meaning that switches are much more secure than hubs. A switch is Full duplex meaning it can send and receive data at the same time. Switches do not use as much bandwidth as hubs because they only send data to

the correct device which is meant to receive that specific data packets.

Switches are very efficient and are usually built in to your home Router.

Switches are located on the second layer which is the Data link layer.

Q4 Part B — 8 marks.

Q4 total — 15 marks.