



12 Pages

1. Please give the information requested in the boxes below.
2. Enter your name in the space provided to the right, fold over and seal down (using the label provided) to hide your name.
3. The answers must be legibly written. The Examiners can either ignore illegible script or have it typed and the expense of typing charged to the candidate.
4. Write your answers in ink.
5. Begin each answer on a fresh page. Do all rough work in the answer book and cross it through.
6. No part of this book is to be torn out; it must be handed in complete.
7. If more books than one are used, fasten them together using the tags available from the invigilator(s).
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SURNAME: Ridley

FORENAME(S): Liam James

7	Number of Answer Books handed in	1
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List the numbers of the questions you have attempted	Office Use
2	15
1	196
4	16 Y2
Office Use	51

Q.2

A). The Six fields in a PPP frame are as follows:-



- The flag field signals the start and end of the frame.
- Address: This ~~sets~~ defines the destination of the frame.
- Control: This defines the control factors.
- Protocol: This defines the routing protocol used to transmit the frame.
- Data: This field contains the data being sent.
- FCS: This field is used to help re-order the frames during transmission. Assigns a sequence number.

B.) The two protocols used by PPP for authentication are:-

- Link Control Protocol (LCP) - This is used to establish the WAN link. Also it sets up and negotiates the control options used on the link. And finally it automatically decides on encapsulation options such as compression, encryption and error detection.

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2. 5.) - ~~NCP~~ (Network Control Protocol) - PPP is capable of using multiple network layer protocols on one link. ~~Each~~ Each network layer protocol is assigned a separate NCP. The NCP decides on the control options best suited to its specific network layer protocol.

c)

Characteristics	LCP	NCP
1.	✓	
2.		✓
3.	✓	
4.	✓	
5.		✓
6.	✓	
7.	✓	

6

15

Q.1. i) The two types of Cisco IPv4 ACL are:-

- Standard - Sequential list of permit or deny statements called ACE's. The statements can define the Source IPv4 address but not the destination.
- Extended - An extended ACL can filter the following factors:-
 - Protocol type
 - Source IP address
 - Destination IP address
 - Source TCP or UDP port.
 - Destination TCP or UDP port.
 - Additional protocol ~~type~~ port numbers for finer control.

ii) Some of the differences between an IPv4 and IPv6 ACL are:-

- IPv6 does not use wildcard masks in the statements. The reason for this is because IPv6 does not use subnetting or VLSM.
- IPv6 has less fields to configure in their statements as it is a simpler protocol.
- IPv6 can be configured on inbound and outbound at the same time.

iii) R1# configure terminal extended
 R1(Config) ipv6 access-list 30 deny tcp 2001:db8:cafe:30::/64 any
~~R1(Config) deny tcp~~
~~R1(Config) 30 deny tcp 2001:db8:cafe:30::/64 any~~

Continues on next page.

Q1.) iii) R1 (access-list) 31 permit TCP any any

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R1 (config) interface S0/0/0

R1 (interface) ipv6 access-group Deny-Cafe-30 in

iv)

Operation	Answer
1	Permit
2	Deny
3	Firewall
4	Six
5	Before
6.	After
7.	Discarded
8.	interface
9.	Protocol

8

19.5

Q. 4) a) Internet of things:

The internet of things is a technology designed to connect millions of devices to the internet. Whether it is a computer or Smartphone, or a coffee maker or wireless temperature sensor. ~~these~~ The IOT allows users to interact with everyday objects through the internet and allows these objects to communicate and work with each other to perform different tasks. There are ~~six~~ ^{several} important factors of IoT Networking:- Network connectivity, fog computing, Security, Network analytics, management and automation, and device interoperability.

3/2

ii. Cloud Computing:

Cloud computing involves taking computers, services, applications, etc. and putting them on servers to be made accessible from anywhere in the world. Cloud computing allows a user to upload files to a server from one computer in one country, and access those same files on a different computer in another country, all through the internet and without the need for a storage device.

2

iii) Virtualisation:

Virtualisation is the process of separating the operating system from the hardware of a computer, thus allowing multiple operating systems to be installed on one host machine. These OS are called virtual machines.

Answer continues on the next page.

Q.4 iii) These virtual machines run on top of a hypervisor. ~~There are two types of hypervisor~~ A The hypervisor is able to interact with the physical aspects of a host machine such as the disk drive and network interface card. There are two types of hypervisor!

- Type-1 (Bare-metal) - ~~This~~ This runs directly on top of the host machine hardware.

- Type-2 (Hosted) - This sits on top of the existing OS of the host machine.

~~iv)~~ iv) Software Defining Networking

~~SDN~~ In networking devices there are two 'planes' :-

- The control plane - This utilises the CPU to create layer 2 and layer 3 route forwarding information.

- The data plane - ~~this~~ Broadcasts data flows across the network - does not make use of the CPU.

In SDN, the control plane is removed from devices and virtualised, instead placing it on a centralised server.

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There are three types of SDN:-

- ~~Dev~~ Device-based SDN - Allows the device to be programmed either by an application installed directly on the device or on a server.
- Controller-based SDN - Has knowledge of every device connected to the network. Allows applications to interface with the controllers responsible for device management and data flow & influencing.
- Policy-based SDN - Adds a policy layer that operates at a higher level of abstraction. ~~For~~ No programming experience is required. ~~to~~ due to its simplicity.