

PAPUA NEW GUINEA UNIVERSITY OF TECHNOLOGY

DEPARTMENT OF MATHEMATICS & COMPUTER SCIENCE

SEMESTER 1 EXAMINATION - 2021

CS311 NETWORKING II

THIRD YEAR BACHELOR OF SCIENCE IN COMPUTER SCIENCE

TIME ALLOWED: 3 HOURS

INFORMATION FOR CANDIDATES

1. Write your student number and name clearly on the front of the answer booklet.
2. You have 10 minutes to read this paper. You must not begin writing during this time.
3. **There are three Sections. You should attempt all the questions in each Section.**
4. All the answers must be written in the answer booklet. No other written materials will be accepted.
5. Do **not** use pencil or red pen to write your answers.
6. **MOBILE PHONES MUST BE SWITCHED OFF** for the entire duration of the examination. Students failing to do so will be penalised.
7. Scientific calculators are permitted.

MARKING SCHEME

Marks are indicated at the beginning of each question. The total is **131 marks**.

SECTION A – OSI Model and IPv4

Question 1 [2 + 3 + 2 + 2 + 2 + 2 + 2 + 2 + 2 + 2 = 21 Marks]

Provide short answers to the following questions.

- (a) How is the OSI model related to the TCP/IP model? Give a brief description.
- (b) Name three functions that are synonymous with the transport layer.
- (c) At which layer of the OSI model is the data called a packet?
- (d) At which layer of the OSI model is the datagram encapsulated into a frame?
- (e) The network interface card on a laptop is faulty. At which layer of the OSI model is the problem going to be diagnosed.
- (f) Which port number by default provides an HTTP (web) connection under the TCP protocol?
- (g) A desktop computer is moved from a Local Area Network (LAN) in Lae to a LAN in Wau. The desktop is now not able to communicate with the rest of the hosts in the LAN. What could be a possible cause for this problem?
- (h) What is data encapsulation?
- (i) What is the equivalent of the decimal number 200 in hexadecimal format? Show your working out.
- (j) What is the equivalent of the hexadecimal number A3 in binary? Show your working out.

Question 2: [(3 + 3 + 2) + 3 + (3 + 3 + 3) = 20 Marks]

Provide short answers to the following questions.

- (a) A network administrator has described his network in the following way, 172.16.0.0/18. A host machine is connected to one of the subnets with the IP address 172.16.150.150/18. Using the information from this PC, determine:
 - (i) Its subnet ID and
 - (ii) Its broadcast address.
 - (iii) Write down the network ID of the last network in this arrangement.
- (b) A network administrator wants to create a subnet that is going to cater for 12 hosts. He is going to use the private network address 10.0.0.0/8. Determine from this information what the new subnet mask is going to be. Write down the subnet mask.
- (c) The management team of the company you are working for acquired a new building with 5 rooms. You are requested to create 5 subnets to cater for this arrangement. You have chosen to use a class C private network address of 192.168.20.0/4. From this requirement, determine:
 - (i) The number of subnets.
 - (ii) The block size of each subnet.
 - (iii) The new subnet mask and corresponding CIDR value.

Question 3: [3 + 2 + 3 + 2 + 3 + 2 = 15 Marks]

Complete the following questions using **Appendix A: DIAGRAM 1**.

Complete the following base configuration requirements for **router Unitech**. For each questions assume global configuration mode has already been activated and complete only the required commands.

- (a) Complete the command to place a console password on the Unitech router. The password is *unitech10*.
- (b) Complete the command to place an encrypted password on the Privileged Exec mode access. The password is *Wickid*.
- (c) Complete the configuration to set up a telnet connection for remote access. The password for the access will be *remote123*.
- (d) Run the command to encrypt all clear text passwords on the router.
- (e) Create a message on the router that deters any unauthorized persons from attempting to login to the router. A message of the type shown below should be displayed.

UNAUTHORISED ACCESS IS NOT ALLOWED!!

- (f) Complete the command to save the current configuration.

Question 4: [3 + 3 + 4 + 3 = 13 Marks]

Complete the following questions using **Appendix A: DIAGRAM 1**.

Provide short answers to the following questions. For all configurations, assume that the router is in global configuration mode.

- (a) Explain what a fully specified route is.
- (b) What information is kept on the routing table and how can you access that information on a router?
- (c) Write a recursive static route on the Unitech router to reach networks on the Telikom router. Note that the Loopback interface simulates access to the cloud from the ISP.
- (d) Complete a default static route on the Telikom router.

Question 5: [10 marks]

Complete the following questions using **Appendix A: DIAGRAM 1**.

Configure the interfaces with the IPv4 addresses on the Telikom router and bring the line protocol up. Assume the router is in global configuration mode.

SECTION B:**[2 + 3 + 1 + 1 + 2 + 3 + 1 + 1 + 1 + 3 + 3 + 1 + 1 = 23 Marks]**

Multiple choice questions testing IPv6 fundamentals. For each question, write down the correct letter or letters A, B, C, D, E or F that correspond to the correct answer. Each question may contain more than one correct answer.

Question 1:

In which two formats can the IPv6 address fd15:0db8:0000:0000:0700:0003:400F:572B be written? (Choose two)

- A. fd15:0db8:0000:0000:700:3:400F:527B
- B. fd15:0db8::7:3:4F:527B
- C. fd15::db8::700:3:400F:527B
- D. fd15:db8::700:3:400F:572B
- E. fd15:db8:0::700:3:4F:527B

Question 2:

Which statements about IPv6 prefixes are true? (Choose three)

- A. FEC0::/10 is used for IPv6 broadcast.
- B. FC00::/7 is used in private networks.
- C. FE80::/8 is used for link-local unicast.
- D. FE80::/10 is used for link-local unicast
- E. 2001::1/127 is used for loopback addresses.
- F. FF00::/8 is used for IPv6 multicast.

Question 3:

Which command can you enter to verify that a 128-bit address is live and responding?

- A. traceroute
- B. telnet
- C. ping
- D. ping ipv6_address

Question 4:

Which technology supports the stateless assignment of IPv6 addresses?

- A. DNS
- B. DHCPv6
- C. DHCP
- D. autoconfiguration

Question 5:

Which two features can dynamically assign IPv6 addresses? (Choose two)

- A. IPv6 stateless autoconfiguration
- B. DHCP
- C. NHRP
- D. IPv6 stateful autoconfiguration
- E. ISATAP tunneling

Question 6:

Which three statements about IPv6 prefixes are true? (Choose three)

- A. FF00::/8 is used for IPv6 multicast.
- B. FE80::/10 is used for link-local unicast.
- C. FC00::/7 is used in private networks.
- D. 2001::1/127 is used for loopback addresses.
- E. FE80::/8 is used for link-local unicast.
- F. FEC0::/10 is used for IPv6 broadcast.

Question 7:

What is one requirement for interfaces to run IPv6?

- A. An IPv6 address must be configured on the interface.
- B. An IPv4 address must be configured.
- C. Stateless autoconfiguration must be enabled after enabling IPv6 on the interface.
- D. IPv6 must be enabled with the ipv6 enable command in global configuration mode.

Question 8:

Which entity assigns IPv6 addresses to end users?

- A. ICANN
- B. APNIC
- C. RIR
- D. ISPs

Question 9:

Which command enables IPv6 forwarding on a cisco router?

- A. IPv6 host
- B. IPv6 unicast-routing
- C. IPv6 local
- D. IPv6 neighbor

Question 10:

What are types of IPv6 static routes? (Choose three)

- A. Recursive routes
- B. Directly connected routes
- C. Fully specified routes
- D. Advertised routes
- E. Virtual links
- F. Redistributed routes

Question 11:

What are three parts of an IPv6 global unicast address? (Choose three)

- A. an interface ID that is used to identify the local host on the network.
- B. an interface ID that is used to identify the local network for a particular host.
- C. a subnet ID that is used to identify networks inside of the local enterprise site
- D. a global routing prefix that is used to identify the network portion of the address that has been provided by an ISP
- E. a global routing prefix that is used to identify the portion of the network address provided by a local administrator

Question 12:

What is the binary pattern of unique IPv6 unique local address?

- A. 00000000
- B. 11111100
- C. 11111111
- D. 11111101

Question 13:

What is IPv6 address ::1 reserved for?

- A. Multicast communication.
- B. Loopback testing.
- C. Embedded IPv4
- D. Anycast solicited node

SECTION C:

This section tests your understanding of the Cisco IOS and base configuration of IPv6 on a router. Use **Appendix B: DIAGRAM 2** to answer the questions that follow.

Question 1: [12 + 6 + 4 + 3 + 4 = 29 marks]

- (a) Complete the interface configuration for the Telkom router.
- (b) Complete the host configuration for the **Server** by completing the IPv6, link local and the default gateway as shown by **FIGURE 3**.

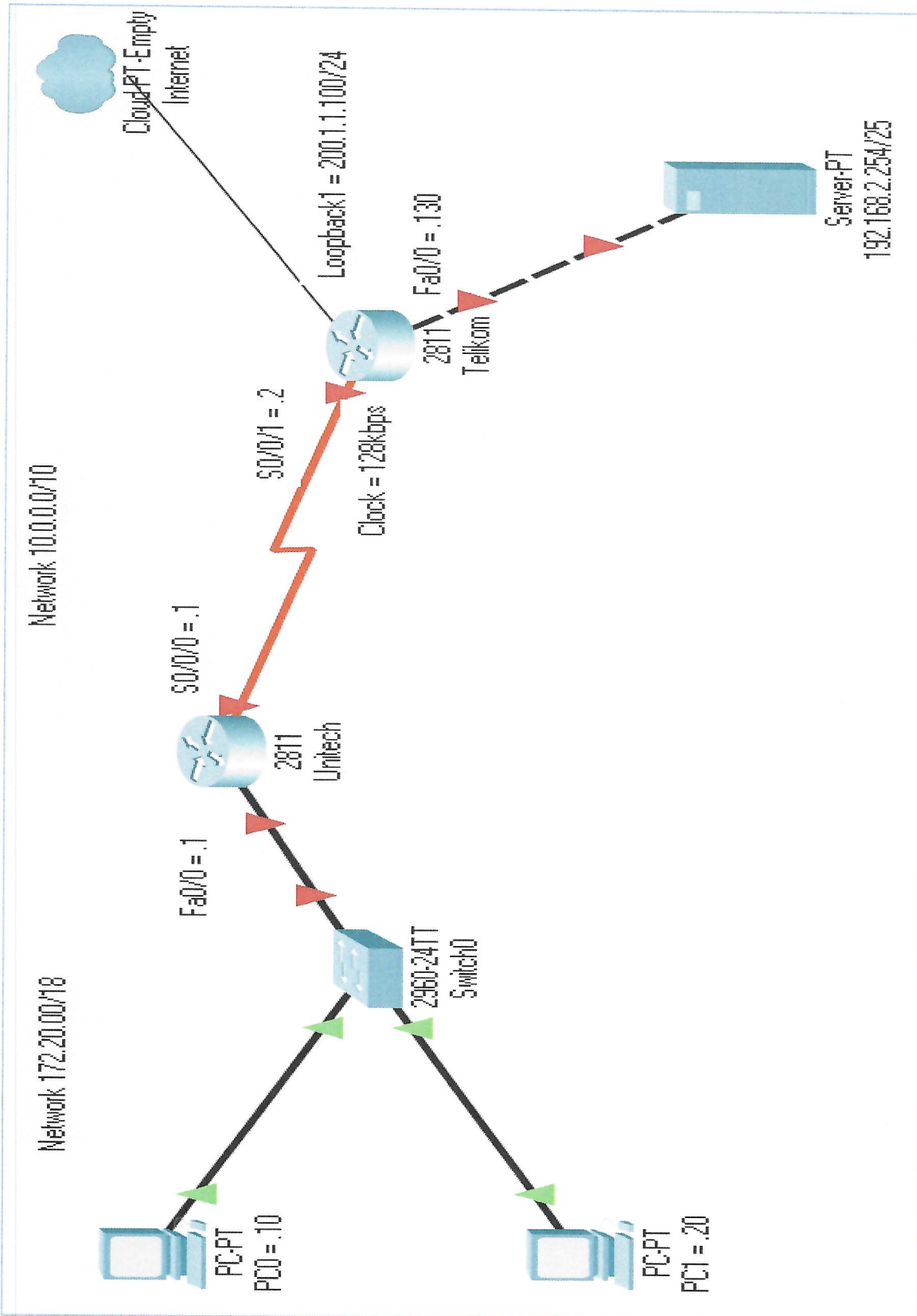
IPv6 Configuration	
<input type="radio"/> Automatic	<input checked="" type="radio"/> Static
IPv6 Address	<input type="text"/> / <input type="text"/>
Link Local Address	<input type="text"/>
Default Gateway	<input type="text"/>

FIGURE 3

- (c) Configure directly connected routes on the Unitech router to access the networks on the Telkom router.
- (d) On the Telkom router create a default static route to reach networks on the Unitech router.
- (e) Write down the automatically generated link local address for **host PC1**.

END OF EXAMINATION

APPENDIX A: DIAGRAM 1



APPENDIX B: DIAGRAM 2

