

PAPUA NEW GUINEA UNIVERSITY OF TECHNOLOGY

DEPARTMENT OF MATHEMATICS AND COMPUTER SCIENCE

SEMESTER 1 EXAMINATION - 2022

CS211 NETWORKING I

SECOND 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 two sections to this exam. Section A consists of Multiple Choice Questions with marks indicated beside each of the questions. You should attempt all the questions.**
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 **129 Marks**.

SECTION A: MULTIPLE CHOICE QUESTIONS.

Questions from 1 – 20 are multiple choice questions. Choose only one answer from the options provided of which you think is the right answer. Make sure to answer all of them.

[1 Mark each = 20 Marks]

1. How many bits are equivalent to one octet in a 32 bit IP address?
(a) 8 bits. (c) 16 bits.
(b) 4 bits. (d) 10 bits.
2. How many layers are described in the OSI model?
(a) 6. (c) 8.
(b) 7. (d) 9.
3. How many layers are described in the TCP/IP model?
(a) 6. (c) 4.
(b) 5. (d) 3.
4. The TCP/IP model is also known as the _____.
(a) Network model. (c) Intranet model.
(b) OSI model. (d) Internet model.
5. Provide the respective names given to packets in Network and Data Link Layer.
(a) Segments and Frames. (c) Datagrams and Frames.
(b) Frames and Payloads. (d) Segments and Datagrams.
6. Which two layers in the TCP/IP model are further divided in the OSI model to describe discrete functions that must occur?
(a) Application and Transport layer.
(b) Transport and Network Access layer.
(c) Network Access and Application layer.
(d) Network Access and Internet layer.
7. The process used to add a protocol header when sending data from the web-client to webserver is called
(a) Message. (c) De-capsulation.
(b) Encapsulation. (d) Decapitation.
8. The process used to remove a header (protocol), when receiving data from webserver is called
(a) De-capsulation. (c) Message.
(b) Encapsulation. (d) None of the above answers are correct.
9. In what year was the Internet protocol suite (TCP/IP) introduced as the standard networking protocol on the ARPANET?
(a) 1982. (c) 1986.
(b) 1981. (d) 1980.

10. PDU is a general name given to;
- (a) Segment.
 - (b) Data.
 - (c) Frames.
 - (d) None of them.
11. Another name for payload is;
- (a) Data.
 - (b) Datagrams and Frames
 - (c) Frames.
 - (d) Segment.
12. During fragmentation, D bits and M bits are set to value 1. What does it means by setting the value to 1?
- (a) Do not fragment.
 - (b) More fragments.
 - (c) Do not fragment and more fragments.
 - (d) Fragmentation and more fragments.
13. Which frame forwarding methods on cisco switches receive the entire frame and computes the CRC?
- (a) Store-and-forward switch.
 - (b) Cut-through switch.
 - (c) Port-based memory.
 - (d) Shared memory.
14. Which of the protocols below controls the flow of data from host to destination?
- (a) SMTP/CD.
 - (b) TCP/IP.
 - (c) CMSA/CD.
 - (d) CSMA/CD.
15. This protocol from question 14, ensures that before the next signal is transmitted, the cable must be cleared of any existing signals. Which communication mode supports this process?
- (a) Simplex mode.
 - (b) Half-duplex mode.
 - (c) Full-duplex mode.
 - (d) Video conferencing.
16. Which frame forwarding methods on cisco switch forwards the frame before it is entirely received?
- (a) Port-based memory.
 - (b) Cut-through switch.
 - (c) Shared memory buffering.
 - (d) Store-and-forward switch.
17. Apart from MAC and IP addresses, what other names can substitute them?
- (a) Logical and IP addresses.
 - (b) DLL and Physical Layer.
 - (c) Physical and MAC addresses.
 - (d) Physical and Logical address.
18. Provide the name of the interaction that occurs at the application and presentation layer and then presentation and session layer when data is passed from one layer below/above the other layer.
- (a) Same layer interaction.
 - (b) Adjacent layer interaction.
 - (c) Presentation layer interaction.
 - (d) Adjacent and Same layer interaction.
19. Which of the standards below define layer 2 protocol and layer 1 technologies?
- (a) Ethernet.
 - (b) Logical Link Control.
 - (c) Media Access Control.
 - (d) TCP/IP.
20. What is the binary number value equivalent of the decimal number 96?
- (a) 01111111.
 - (c) 1110000.

(b) 1100000.

(d) 1010000.

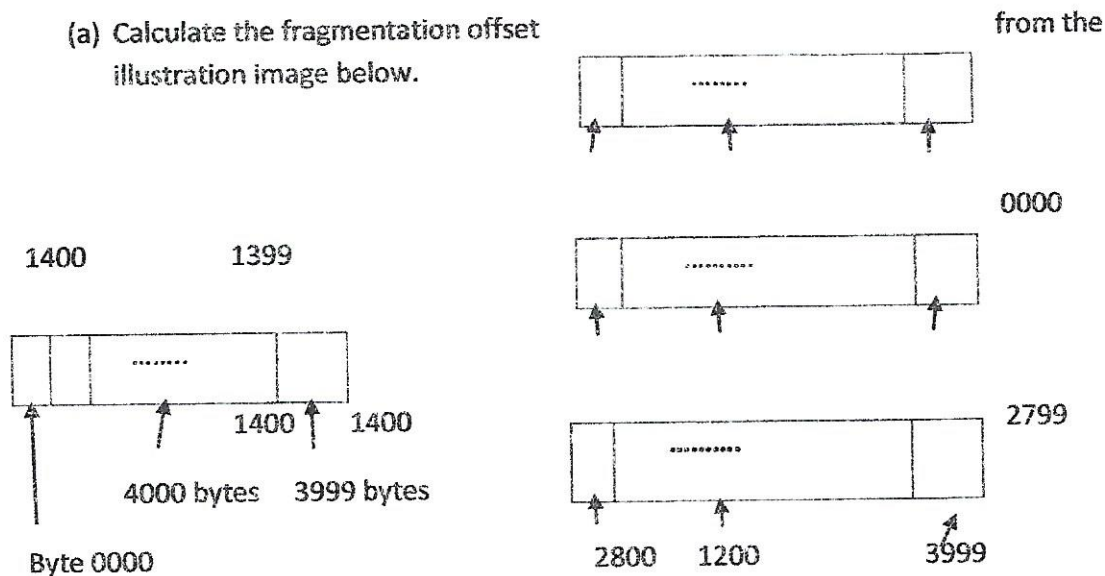
SECTION B: SHORT ANSWER QUESTIONS

[109 Marks]

Please make sure to attempt all the questions and write their respective answers in the answer booklet.

Question 21 [3 + 1 + 3 + 2 = 9 Marks]

(a) Calculate the fragmentation offset from the illustration image below.



(b) By how much is fragmentation offset measured?

(c) Name the three flags in fragmentation.

(d) In the process of fragmentation, D bits and M bits are set to value 0. What does this value imply?

Question 22 [7 + 2 + 3 + 4 + 2 + 3 + 4 + 1 + 1 = 27 Marks]

(a) Name the layers of the OSI model from the top layer to the lower/bottom layer as always seen.

(b) Which two layers in the OSI model does packets are referred to as datagrams and frames respectively?

(c) Name the TCP/IP model layers.

(d) Provide the names of the four protocols that are used at the network layer of the TCP/IP protocol suite.

(e) Name the two protocols used in the transport layer of TCP/IP protocol suite.

(f) Provide the three job specifications or tasks that an IPv4 does.

(g) As shown from the table below, provide the corresponding standard for each specification shown.

Standards	Physical Cabling & Network
(i)	Ethernet LAN
(ii)	Broadband LAN
(iii)	Fibre-Optic LAN and MAN
(iv)	Wireless LAN

(h) Which of the standards listed in (g) above uses 2.4GHz frequency band to transmit data up to 2mbps?

(i) Name the well-known standard adopted by IEEE.

Question 23 [6 + (1+1+1) + 6 + 2 + 2 + 3 + 3 = 25 Marks]

- (a) In a network, messages are being send from one device to another. Name the three modes that are used in message transmission and define each of them?
- (b) Indicate the communication mode that best fits the scenarios/examples stated below.
 - i. A computer sends print commands to the printer and the printer prints or accepts the commands.
 - ii. Two security officers communicating via a walkie talkie radio.
 - iii. A husband is calling from Australia and the wife is receiving the call from Lae via a Whatsapp call.
- (c) In a computer system, networking hardware are divided into two sections. Name the two sections, define them and provide an example for each.
- (d) Name the two sub layers of Data link sub layers.
- (e) Name the two Media Access Control methods.
- (f) Frames have three basic parts. Name these three basic parts of a frame.
- (g) In LAN and WAN frames, provide three examples of layer 2 protocols.

Question 24 [3 + 2 + 6 + (1+1+1+1) + 4 + 2 + 2 = 23 Marks]

- (a) All communication methods have three elements in common. Name these three elements.
- (b) Rules and or protocols govern all methods of communication. Name the two types of communication.

- (c) There are three types of messages that are being sent through the network. Name these three messages and their delivery options respectively.
- (d) Communication between a webserver and a web client is an example of an interaction between several protocols. Define each of the protocols listed below.
- | | |
|-----------|----------------|
| (i) HTTP. | (iii) IP. |
| (ii) TCP. | (iv) Ethernet. |
- (e) Provide the names of the TCP/IP layers at which the protocols mentioned in (d) are used.
- (f) Name the two Frame Forwarding methods on Cisco Switches.
- (g) There are two types of Memory Buffering on switches. Name them.

Question 25 **[2 + 1 + 3 + 3 + 3 + 1 = 13 Marks]**

- (a) There are two primary addresses to a device on an Ethernet LAN – Physical address and Logical address. What other names do we give to these addresses?
- (b) What address resides at layer 2 and has a 48-bit binary value expressed as 12 hexadecimal digits?
- (c) Name the three characteristics of the Internet Protocol.
- (d) Migration techniques can be divided into three categories for IPv4 and IPv6 coexistences. Name the three categories.
- (e) There are three types of IPv6 addresses. Name all of them.
- (f) Of these two protocols – IPv4 and IPv6, which one does not have a broadcast address?

Question 26 **[3 + 3 + 3 + 3 = 12 Marks]**

For this questions, show the working out.

- (a) Calculate 192.168.11.10 to binary positional value.
- (b) Calculate 11111000 to decimal.
- (c) Calculate the IPv4 11000000.10101000.00001010.00000010 to decimal.
- (d) Convert the decimal value 255 to its binary equivalent.

END OF EXAMINATION