

PAPUA NEW GUINEA UNIVERSITY OF TECHNOLOGY

DEPARTMENT OF MATHEMATICS & COMPUTER SCIENCE

SEMESTER 1 EXAMINATION - 2021

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 and Section B. Section A consists of Multiple Choice Questions worth 21 marks and Section B consists of Short Answer Questions worth differing marks as stated 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 **123 Marks**.

SECTION A: MULTIPLE CHOICE QUESTIONS.

Questions from 1 – 21 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 = 21 Marks]

1. How many bits are equivalent to 4 octets 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. Which protocol model was created in the early 1970s for Internetwork communications?
(a) HTTP. (c) SMTP.
(b) FTP. (d) TCP/IP.
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. In what year was access to the ARPANET expanded?
- (a) 1981. (c) 1986.
(b) 1982. (d) 1980.
11. Which one of the words listed below is a networking standards organization?
- (a) FTP. (c) HTTP.
(b) ITU-T. (d) SMTP.
12. Which of the words listed below is a networking protocol?
- (a) SMTP. (c) ANSI.
(b) TCP/IP. (d) Both (a) and (b) are correct.
13. Which two physical layer standards are implemented in the hardware?
- (a) Application and Presentation.
(b) Session and Transport.
(c) Network and Transport.
(d) Data link and Physical.
14. Which of the protocols below controls the flow of data from host to destination?
- (a) SMTP/CD. (c) CMSA/CD.
(b) TCP/IP. (d) CSMA/CD.
15. This protocol from question 14 above, 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. (c) Full-duplex mode.
(b) Half-duplex mode. (d) Video conferencing.
16. The TCP/IP model is known as the
- (a) Internet model. (c) Full standard.
(b) Open standard. (d) Both (a) and (b) are correct.
17. As application data is being passed down the protocol stack, information is added at each level. This is known as
- (a) Sending. (c) De – encapsulation process.
(b) Encapsulation process. (d) Receiving.
18. The form that the data takes at each layer is known as a
- (a) PDU. (c) Data Wrapping.
(b) UDP. (d) Physical layer.
19. The process used by a receiving device to remove one or more protocol headers is known as
- (a) Encapsulation. (c) Decapitate.
(b) De-encapsulation. (d) None of the above answers are correct.
20. Which of the standards below define layer 2 protocol and layer 1 technologies?
- (a) Ethernet. (c) Media Access Control.
(b) Logical Link Control. (d) None of the above answers are correct.

21. What is the binary number value equivalent of the decimal number 96?

- (a) 0111111.
- (b) 1100000.
- (c) 1110000.
- (d) 1010000.

SECTION B: SHORT ANSWER QUESTIONS

[102 Marks]

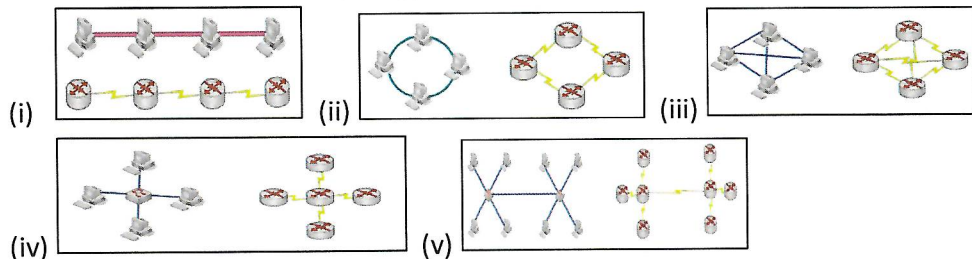
Please make sure to attempt all the questions and write their respective answers in the answer booklet.

Question 22 [7 + 4 + 1 + 6 + 5 = 23 Marks]

- (a) Name the layers of the OSI model from the first layer, to the last layer.
- (b) Well known standards adopted by the IEEE are the 802 standards. Correctly specify the physical cabling for each of the standards listed in the table below.

Standards	Physical Cabling & Network
802.3	
802.7	
802.8	
802.11	

- (c) Which of the standards listed above uses 2.4GHz frequency band to transmit data up to 2mbps?
- (d) Provide the names of the three most common types of networks and give their definitions as well.
- (e) From the images of network topology below, name each of the topologies correctly.



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

- (a) In a network, messages are being sent from one device to another. Can you name the three modes that are used in message transmission and define 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) Name the 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 kinds or 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.
 - (ii) TCP.
 - (iii) IP.
 - (iv) Ethernet.
- (e) Provide the names of the layers at which the protocols mentioned in question (d) above are used in the TCP/IP model.
- (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 + 1 + 1 + 4 + 3 + 3 + 1 = 19 Marks]

- (a) There are two primary addresses to a device on an Ethernet LAN – Physical address and Logical address. What other names are these addresses known by?

- (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) Explain what a router is?
- (e) What does a router need or require in order to function as a computer?
- (f) Name four of the types of memories a router uses.
- (g) The migration techniques can be divided into three categories in IPv4 and IPv6 coexistences. Name the three categories.
- (h) There are three types of IPv6 addresses. Name all of them.
- (i) 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 the Dotted decimal notation of 192.168.11.10 to a binary positional value.
- (b) Calculate the Binary positional value of 11111000 to decimal value.
- (c) Calculate the Binary positional value of 11000000.10101000.00001010.00000010 to decimal value.
- (d) Convert the decimal value 255 to its binary equivalent.

END OF EXAMINATION