Preview Test: COMS3200 Semester One Final Examination 2021

Test Information

Description	Undertaking this online examination deems your commitment to UQ's academic integrity pledge as summarised in the following declaration: *"I certify that I have completed this examination in an honest, fair and trustworthy manner, that my submitted answers are entirely my own work, and that I have neither given nor received any unauthorised assistance on this examination".*
Instructions	You need to answer all of the questions in the Blackboard Test.
Multiple Attempts	Not allowed. This test can only be taken once.
Force Completion	This test can be saved and resumed later.
	Your answers are saved automatically.

QUESTION 1

3 points Save Answer

Which statement(s) is(are) true regarding Internet? Choose all the correct answer(s).

- [ ] 1. FDM uses different channels transmitted in different frequency bands
- [ ] 2. End systems are also known as hosts on the Internet.
- [ ] 3. NAT is commonly used for a home network to provide access to the Internet.
- [ ] 4. One of the well-known protocols used in WAN is 802.11b.
- [ ] 5. ADSL offers much more bandwidth for uploads by sacrificing bandwidth available for downloads.

QUESTION 2

3 points Save Answer

Which of the following statement(s) is(are) correct? Please choose all the correct one(s).

- [ ] 1. Each Internet Service Provider (ISP) is an AS.
- [ ] 2. An average throughput is a rate at given point in time (bits/time unit).
- [ ] 3. A stub AS has only one connection to another AS.
- [ ] 4. The 'traceroute' program can be used to measure Internet delays and typically uses three probes.
- [ ] 5. A transit AS is connected to more than one AS and does not allow traffic to pass through.

QUESTION 3

5 points Save Answer

Match TCP/IP layer to the most appropriate function.

- [-] Application layer
- [-] Transport layer
- [-] Network layer
- [-] Link layer
- [-] Physical layer

1. provides end-to-end delivery of data from the source host to the destination host
2. uses a MAC to generate the frames.
3. provides packet forwarding including routing through intermediate routers
4. deals with data in the form of bits.
5. provides the interfaces and protocols needed by the users.

QUESTION 4

3 points Save Answer

Which of the following statement(s) regarding is(are) correct? Please choose all the correct one(s).

- [ ] 1. The specification of open application protocols is defined in RFCs.
- [ ] 2. Typically, types of messages exchanged between peers are request and response messages.
- [ ] 3. A FTP service requires a minimum throughput (e.g., 1 Mbps) and time-insentive.
- [ ] 4. In client-server architecture, clients communicate directly with each other without using a server.
- [ ] 5. In P2P architecture, arbitrary hosts can directly communicate.

QUESTION 5

3 points Save Answer

Which of the following statement(s) regarding HTTP/web are(is) correct? Please choose all the correct one(s).

- [ ] 1. In an HTTP response message, "Keep-Alive: timeout=15, max=50" means that it allows the connection to be kept alive for 15 seconds and a maximum of 50 resources by the server.
- [ ] 2. The underlying protocol for HTTP/1.0 is TCP.
- [ ] 3. A web cookie can be used for authorization and it may cause users' privacy issues.
- [ ] 4. A server can define a cookie-specific action.
- [ ] 5. One of the metho types in HTTP/1.1 is PUT.

QUESTION 6

3 points Save Answer

Which of the following statement(s) are(is) correct? Please choose all the correct one(s).

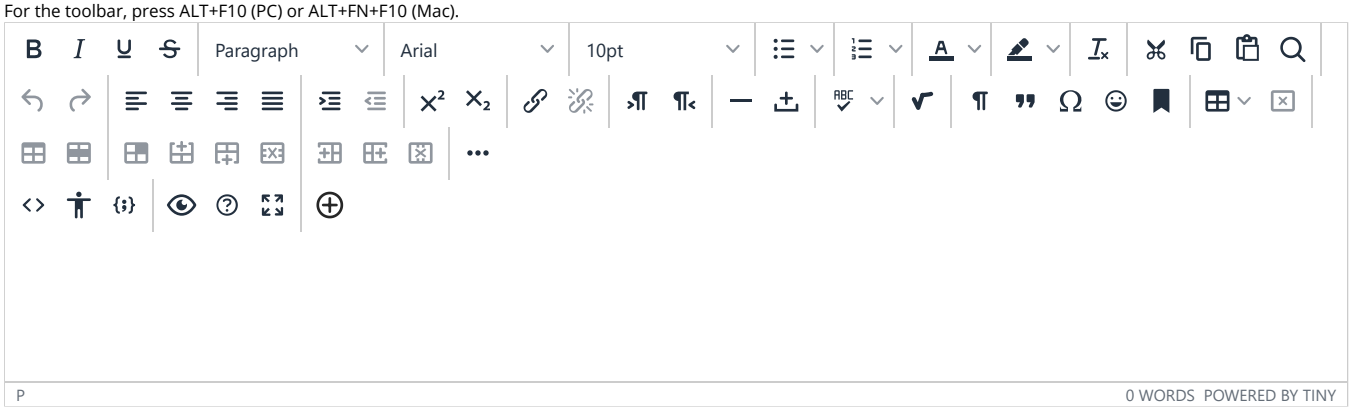
- [ ] 1. SMTP usually uses non-persistent connections similar to HTTP.
- [ ] 2. DNS typically uses the recursive query method.
- [ ] 3. IMAP does not keep all messages at a server, but POP does.
- [ ] 4. DNS servers can be maliciously exploited by attackers to launch DDoS attacks.
- [ ] 5. SMTP uses TCP for reliable data transfer of email.

QUESTION 7

3 points Save Answer

What is the reason to perform multiplexing/demultiplexing? Briefly explain.

For the toolbar, press ALT+F10 (PC) or ALT+FN+F10 (Mac).

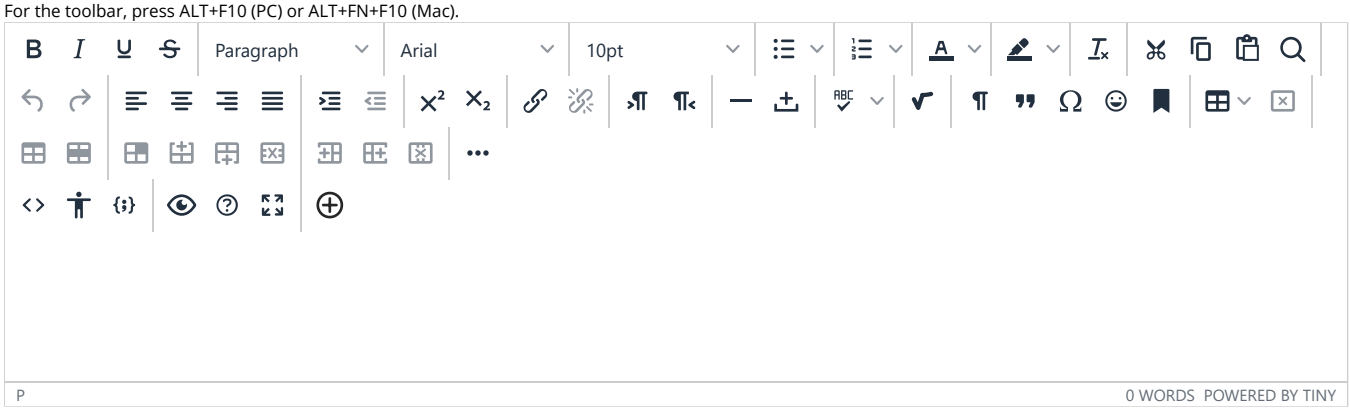


QUESTION 8

3 points Save Answer

Explain **two** reasons why UDP is for DNS service.

For the toolbar, press ALT+F10 (PC) or ALT+FN+F10 (Mac).



QUESTION 9 **3 points** Save Answer

What are **two** factors RDT2.0 takes into account compared RDT1.0? Briefly explain.

For the toolbar, press ALT+F10 (PC) or ALT+FN+F10 (Mac).

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QUESTION 10 **2 points** Save Answer

Briefly explain the one advantage of pipelined protocols compared to stop-and-wait protocol.

For the toolbar, press ALT+F10 (PC) or ALT+FN+F10 (Mac).

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QUESTION 11 **3 points** Save Answer

In what situation GBN is better than Selective repeat? Briefly explain.

For the toolbar, press ALT+F10 (PC) or ALT+FN+F10 (Mac).

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QUESTION 12 **6 points** Save Answer

In TCP congestion control, briefly explain each method: 1) AIMD, 2) TCP Slow Start, and 3) Congestion Avoidance.

For the toolbar, press ALT+F10 (PC) or ALT+FN+F10 (Mac).

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QUESTION 13 **3 points** Save Answer

Which header fields must be updated before the router sends out a packet?

- [ ] 1. type of service
- [ ] 2. TTL
- [ ] 3. upper layer
- [ ] 4. checksum
- [ ] 5. source IP address

QUESTION 14

3 points Save Answer

Alice sends a 1000 byte packet from Brisbane to Sydney. Assume that Brisbane is 900km from Sydney and that the propagation speed is 300,000km/s.
What is the propagation delay (in milliseconds)? You have to write down the equation and workings.

For the toolbar, press ALT+F10 (PC) or ALT+FN+F10 (Mac).

Paragraph | Arial | 10pt

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QUESTION 15

3 points Save Answer

Alice sends a 1000 byte packet from Brisbane to Sydney. Assume that Brisbane is 900km from Sydney and that the propagation speed is 300,000km/s. Assume a link between UQ and Usyd is 200Kbps, and all other links are much faster than 200Kbps. What is the transmission delay (in milliseconds)? You have to write down the equation and workings.

For the toolbar, press ALT+F10 (PC) or ALT+FN+F10 (Mac).

Paragraph | Arial | 10pt

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QUESTION 16

3 points Save Answer

Briefly explain the difference between flow control and congestion control.

For the toolbar, press ALT+F10 (PC) or ALT+FN+F10 (Mac).

Paragraph | Arial | 10pt

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QUESTION 17

3 points Save Answer

Assume node A (client) is connecting to a network with a DHCP server and is not manually configured. What is the value of the source IP address field set to in the DHCP discovery message the client will send to the DHCP server?

For the toolbar, press ALT+F10 (PC) or ALT+FN+F10 (Mac).

Paragraph | Arial | 10pt

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QUESTION 18

3 points Save Answer

What is the reason that all of the DHCP messages are broadcast messages? Briefly explain.

For the toolbar, press ALT+F10 (PC) or ALT+FN+F10 (Mac).

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QUESTION 19

4 points Save Answer

Packet scheduling in a router. Assume that the following packets are waiting to be transmitted on an output link of a router. The numbering specifies the order in which these packets arrived, and underlined packets having higher priority: 1,2,3,4,5,6.

(a) If FIFO scheduling is used, in what order will these packets be transmitted? (use commas; e.g., 6,5,4,2,1,3.)

Answer:

(b) If (strict) priority scheduling is used, in what order will these packets be transmitted?

Answer:

QUESTION 20

9 points Save Answer

Assume that there is a router that has 3 links with MTU as follows:

Link	MTU (in bytes)
X	100
Y	400
Z	1000

(a) A router receives a 800-byte IPv4 packet from link Z, and it has to forward it to link Y. If the packet from link Z has 20 bytes header, fill in the value of *total length, flag,* and *fragmentation offset* fields of each outgoing packet.

packet	Total length	flag	Offset
Packet 1			
Packet 2			
Packet 3			

(b) The router receives 30 fragmented packets from link X, and needs to send them to link Z. How many packets will be sent over link Z? Why?

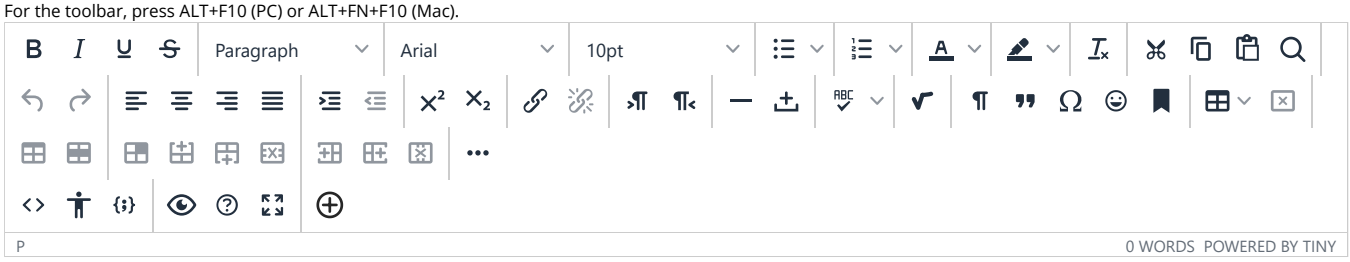
Answer:

QUESTION 21

3 points Save Answer

What are two reasons that some customers need and use NAT?

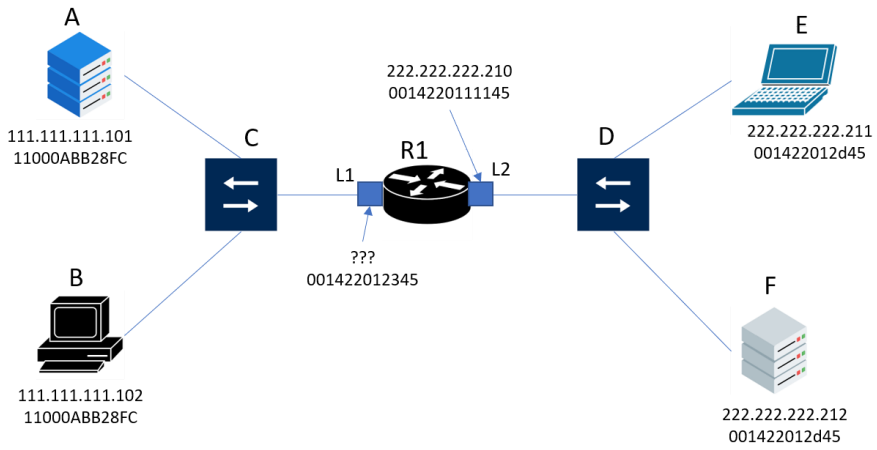
For the toolbar, press ALT+F10 (PC) or ALT+FN+F10 (Mac).



QUESTION 22

10 points Save Answer

Consider the LAN example. Answer each question briefly.



(a) Assign an IP address to the L1 interface of the router R1, give that the subnet part of IP addresses is 24 bits.

Answer:

(b) Suppose that B wants to send an IP datagram to F but B knows the domain name of B but does not know the IP address of F. What is the first step to do so (hint: you have to use a server)?

Answer:

(c) Suppose that A wants send an IP datagram to B and knows B's IP address. How does A do so? What protocol(s) should be used?

Answer:

(d) Suppose that E wants to send an IP datagram to B and knows B's IP address. Must E know C's MAC address to send the datagram to B? If so, how does E get this information? If not, explain why not.

Answer:

(e) Suppose that R1 has a datagram (which was originally sent by F) to send to A. What are the MAC addresses on the frame that is sent from R1 to A? What are the IP addresses in the IP datagram encapsulated within this frame?

Source IP:

Destination IP:

Source MAC address:

Destination MAC address:

(f) Now assume that the router R1 is removed from the Figure. Suppose that the network administrator wants to assign A and F to the same VLAN and B and E to a different VLAN. When a frame is forwarded between switches, how does the receiving switch know which VLAN the frame is destined to?

Answer:

QUESTION 23

2 points Save Answer

What is the remainder R, given G = 1001 and D = 10101010?

For the toolbar, press ALT+F10 (PC) or ALT+FN+F10 (Mac).

Paragraph | Arial | 10pt

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QUESTION 24

2 points Save Answer

A group of N stations shares a 56-kbps pure ALOHA channel. Each station outputs a 100-bit frame on an average of once every 10 sec, even if the previous one has not yet been sent (e.g., the stations can buffer outgoing frames). What is the maximum value of N?

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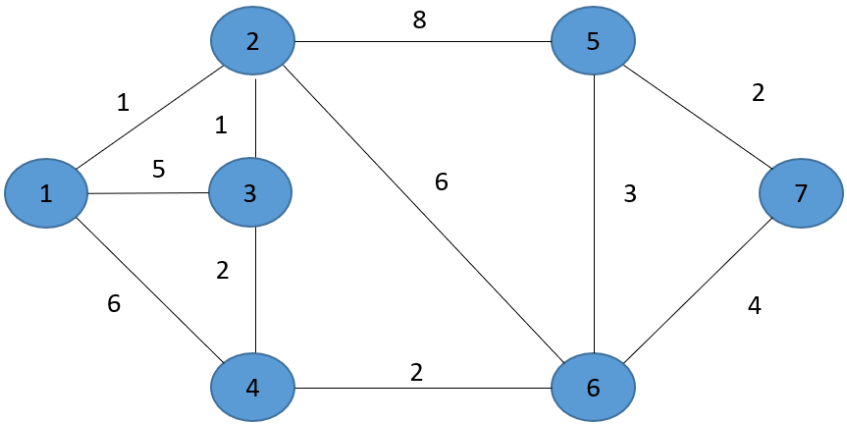
QUESTION 25

8 points Save Answer



Apply the Bellman-Ford algorithm on the example network given in Figure 1 to find the minimum-cost routes from station 1 to all other stations. Please make a table contain the values. Please use "inf" to specify an infinite cost and "-" to specify no next-hop respectively.

	Hop 1		Hop 2		Hop 3		Hop 4		Hop 5		H
des	cost	hop	cost	hop	cost	hop	cost	hop	cost	hop	cost
1											
2											
3											
4											
5											
6											
7											

QUESTION 26

4 points Save Answer

Why MPLS is used for the internet? What is one main difference of MPLS compared to IP routing?

For the toolbar, press ALT+F10 (PC) or ALT+FN+F10 (Mac).

Paragraph Arial 10pt

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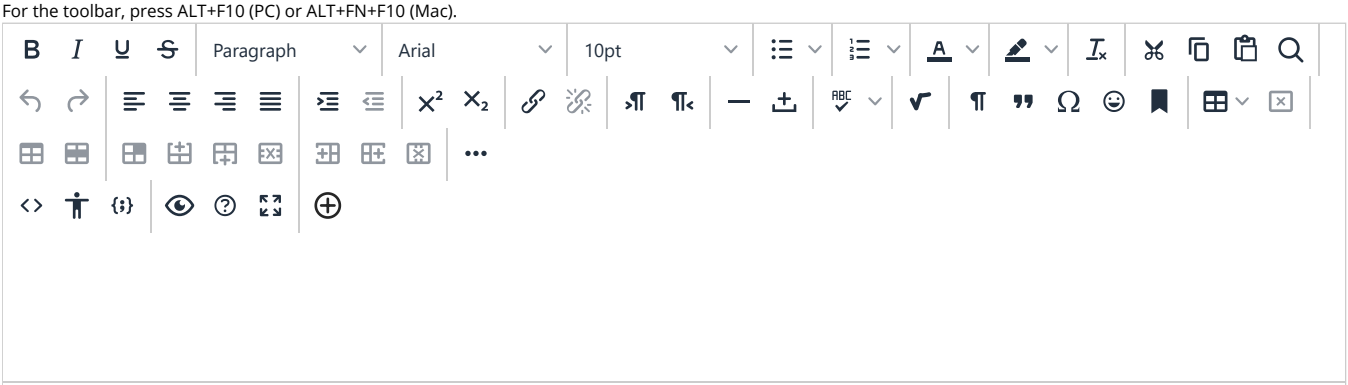
QUESTION 27

0 points Save Answer

Please specify any assumptions you have made in completing this examination and which questions those assumptions relate to. You may also include queries you may have made with respect to a particular question, should you have been able to 'raise your hand' in an examination room.

For the toolbar, press ALT+F10 (PC) or ALT+FN+F10 (Mac).



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