Started on	Wednesday, 21 October 2020, 9:12 PM
State	Finished
Completed on	Wednesday, 21 October 2020, 9:58 PM
Time taken	45 mins 43 secs

Information

The questions on this page are all yes/no questions. Please read them carefully.

Question **1**

Incorrect

Marked out of 1.00

The Bellman-Ford algorithm assumes that each node in the network knows the full network topology.

Select one:

- True
- False ✖

Question **2**

Correct

Marked out of 1.00

The physical layer can change its modulation scheme dependent on the source port number of an encapsulated TCP segment.

Select one:

- True
- False ✔

Question **3**

Correct

Marked out of 1.00

OSPF does not perform hierarchical routing.

Select one:

- True
- False ✔

Question **4**

Correct

Marked out of 1.00

RIP is load-insensitive, i.e. its routing decisions do not depend on traffic load.

Select one:

- True ✔
- False

Question **5**

Correct

Marked out of 1.00

BGP is load-sensitive because it is an inter-AS routing protocol.

Select one:

- True
- False ✔

Question **6**

Correct

Marked out of 1.00

At the network layer, routers rely on a forwarding table to forward arriving packets.

Select one:

- True ✔
- False

Question **7**

Correct

Marked out of 1.00

Both intra-AS and inter-AS routing protocols feed entries into forwarding tables.

Select one:

- True ✔
- False

Question **8**

Correct

Marked out of 1.00

A multi-homed AS allows traffic to pass through because it is connected to multiple ASes.

Select one:

- True
- False ✔

Question **9**

Correct

Marked out of 1.00

Hierarchical routing is adopted in the Internet.

Select one:

- True ✔
- False

Question **10**

Correct

Marked out of 1.00

In today's Internet the BGP protocol is the only relevant inter-AS routing protocol.

Select one:

- True ✔
- False

Question **11**

Correct

Marked out of 1.00

The term '*routing protocol*' means the same as the term '*routing algorithm*'. There is no difference between them.

Select one:

- True
- False ✔

Question **12**

Correct

Marked out of 1.00

Poisoned reverse can solve the count-to-infinity problem in distance vector routing.

Select one:

- True
- False ✔

Question **13**

Correct

Marked out of 1.00

In NAT (Network address translation), port numbers are used for addressing hosts.

Select one:

- True ✔
- False

Question **14**

Correct

Marked out of 1.00

The size of an IPv6 address is 64 bits.

Select one:

- True
- False ✔

Question **15**

Correct

Marked out of 1.00

A router with a pure IPv6 protocol stack will process IPv4 packets.

Select one:

- True
- False ✔

Question **16**

Correct

Marked out of 1.00

Parity check can correct one bit error.

Select one:

- True
- False ✔

Question **17**

Correct

Marked out of 1.00

There is no carry in the calculation of the Internet checksum because it applies modulo-2 arithmetic.

Select one:

- True
- False ✔

Question **18**

Correct

Marked out of 1.00

All CRC (Cyclic Redundancy Check) calculations are done in ones' complement arithmetic.

Select one:

- True
- False ✔

Question **19**

Correct

Marked out of 1.00

In Selective Repeat (SR) protocol, only a single packet will be retransmitted on timeout.

Select one:

- True ✔
- False

Question **20**

Correct

Marked out of 1.00

Transport layer flow control deals with end hosts, not with intermediate routers.

Select one:

- True ✔
- False

Question **21**

Correct

Marked out of 1.00

TCP uses an exponential weighted moving average (EWMA) when it estimates the round-trip time between sender and receiver.

Select one:

- True ✔
- False

Question **22**

Correct

Marked out of 1.00

TCP provides a reliable transport service between two processes running on different hosts.

Select one:

- True ✔
- False

Question **23**

Correct

Marked out of 1.00

HTTP is not 'stateless' because it uses cookies.

Select one:

- True
- False ✔

Question **24**

Correct

Marked out of 1.00

There are more than one DNS root server in the Internet.

Select one:

- True ✔
- False

Information

In all the questions on this page there is only one correct answer.

Question **25**

Correct

Marked out of 2.00

The Internet protocol stack has five layers, namely (in an unordered way), Network layer (N), Physical layer (P), Link layer (L), Application layer (A), and Transport layer (T). Please select the right order of the layers from the top to the bottom.

Select one:

- a. ANTLP
- b. ATNLP ✔
- c. ALNTP
- d. TANLP

Your answer is correct.

Question **26**

Correct

Marked out of 2.00

Which field is **not** present in the IPv6 datagram header:

Select one:

- a. Internet checksum ✔
- b. Version
- c. Source address
- d. Hop limit

Your answer is correct.

Question **27**

Correct

Marked out of 2.00

Which of the following services are provided by TCP?

Select one:

- a. Guaranteed delivery of application layer messages
- b. Flow control
- c. Congestion control
- d. All of the above ✔

Your answer is correct.

Question **28**

Correct

Marked out of 2.00

In the DV-algorithm (Bellman-Ford), which information is exchanged between a node and its neighbours?

Select one:

- a. The number of nodes in the network
- b. Its own distance vector ✔
- c. All distance vectors it has received from its neighbours
- d. All of the above

Your answer is correct.

Question **29**

Correct

Marked out of 2.00

Which layer is RIP typically implemented at?

Select one:

- a. Application layer ✔
- b. Physical layer
- c. Network layer
- d. Transport layer

Your answer is correct.

Question **30**

Correct

Marked out of 2.00

What are the practical options for transitioning from IPv4 to IPv6?

Select one:

- a. Dual-stack approach
- b. Declaring a flag day
- c. Tunnelling
- d. Both a. and c. ✔

Your answer is correct.

Question **31**

Correct

Marked out of 2.00

Suppose the information to be sent is 101011. Which bits are sent by the sender after applying a one-bit even parity scheme?

Select one:

- a. 1010111
- b. 1010110 ✔
- c. 101011
- d. 101010

Your answer is correct.

Question **32**

Correct

Marked out of 2.00

The Internet checksum in the IP header is needed even when the link layer performs perfect error checking, because:

Select one:

- a. the Cyclic Redundancy Check (CRC) check is weaker than the Internet Checksum and therefore could miss out on more errors.
- b. every layer in the Open Systems Interconnection (OSI) model needs an error-detecting technique.
- c. even if it travels through the transmission medium perfectly, router memory could cause an error in the packet. ✔
- d. this allows the packet to do Forward Error Correction (FEC) if there is a one bit error.

Your answer is correct.

Question **33**

Correct

Marked out of 2.00

In a computer network setting, reliable data transfer protocols based on acknowledgements and retransmission are known as:

Select one:

- a. Sliding-window protocols
- b. Stop-and-wait protocols
- c. Alternating-bit protocols
- d. ARQ protocols ✔

Your answer is correct.

Question **34**

Correct

Marked out of 2.00

Which of the following protocol mechanisms are used in TCP's reliable data transfer service?

Select one:

- a. Sequence numbers
- b. Timers
- c. Acknowledgements
- d. All of the above ✔

Your answer is correct.

Question **35**

Correct

Marked out of 2.00

Which of the following protocols typically builds on UDP?

Select one:

- a. RIP ✔
- b. BGP
- c. HTTP
- d. SMTP

Your answer is correct.

Question **36**

Correct

Marked out of 2.00

Concerning the **slow start** phase of TCP congestion control, which of the following statements is correct?

Select one:

- a. During this phase, the TCP senders begins by transmitting at a fast rate and increases its sending rate linearly
- b. During this phase, the TCP senders begins by transmitting at a slow rate and increases its sending rate linearly
- c. During this phase, the TCP senders begins by transmitting at a slow rate and increases its sending rate exponentially ✔
- d. During this phase, the TCP senders begins by transmitting at a fast rate and increases its sending rate exponentially

Your answer is correct.

Question **37**

Correct

Marked out of 2.00

Which of the following protocols is **not** a mail access protocol?

Select one:

- a. SMTP ✔
- b. POP3
- c. IMAP
- d. None of the above

Your answer is correct.

Information

In all the questions on this page there can be arbitrarily many correct answers (there is always at least one).

Question **38**

Correct

Marked out of 2.00

Which protocols use the distance-vector (DV) algorithm for routing in the Internet?

Select one or more:

- a. RIP ✔
- b. OSPF
- c. Neither of them

Your answer is correct.

Question **39**

Correct

Marked out of 2.00

Which protocols are used for intra-AS routing in the Internet?

Select one or more:

- a. RIP ✔
- b. OSPF ✔
- c. BGP
- d. All of the above

Your answer is correct.

Question **40**

Correct

Marked out of 2.00

Which of the following would be expected to own a transit AS?

Select one or more:

- [x] a. Vodafone
- [ ] b. Netflix
- [x] c. Spark
- [ ] d. University of Canterbury

Your answer is correct.

Question **41**

Correct

Marked out of 2.00

Which of the following statements are(is) correct?

Select one or more:

- [ ] a. TCP use source and destination MAC addresses to multiplex/demultiplex between applications.
- [x] b. UDP has no congestion control
- [x] c. It is possible for an application to have reliable data transfer when using UDP
- [ ] d. None of the above

Your answer is correct.

Question **42**

Correct

Marked out of 2.00

If stop-and-wait is treated like a sliding window scheme, what is the maximum window size?

Select one:

- a. 4
- b. 8
- c. 2
- d. 1

Your answer is correct.

Question **43**

Correct

Marked out of 2.00

In the Go-Back-N protocol, which (one or more) of the following actions will the sender take when there is a timeout event?

Select one or more:

- [x] a. The sender resends all packets that have been previously sent but that have not yet been acknowledged
- [ ] b. The sender resends the all packets that have been previously sent and acknowledged
- [ ] c. The sender resends the oldest packet which has not yet been acknowledged
- [ ] d. The sender resends the all packets that have been previously sent including those that have been acknowledged

Your answer is correct.

Question **44**

Correct

Marked out of 2.00

Which of the following statements about the Selective Repeat (SR) Protocol are correct:

Select one or more:

- [ ] a. In-order packets will also be buffered to be delivered to the upper layer later;
- [x] b. The SR receiver will acknowledge a correctly received packet whether or not it is in order; ✔
- [ ] c. The SR receiver will acknowledge a correctly received in-order packet only;
- [x] d. Out-of-order packets will be buffered to be delivered to the upper layer later; ✔

Your answer is correct.

Question **45**

Correct

Marked out of 2.00

Which of the following statements are correct:

Select one or more:

- [ ] a. Checksum can be used to detect and correct bit errors in a transmitted packet
- [x] b. Timer can be used to detect packet loss, but timeout can occur when a packet is just delayed but not lost ✔
- [x] c. Packets with duplicate sequence numbers allow the receiver to detect duplicate copies of a packet ✔
- [x] d. Go-Back-N protocol uses cumulative acknowledgements ✔

Your answer is correct.

Question **46**

Correct

Marked out of 2.00

Which of the following might happen in a congested network?

Select one or more:

- [x] a. Large queueing delay ✔
- [x] b. Unnecessary retransmissions ✔
- [x] c. Packets being dropped ✔
- [ ] d. None of the above

Your answer is correct.

Question **47**

Correct

Marked out of 2.00

When HTTP uses non-persistent connections, which of the following are disadvantages?

Select one or more:

- [x] a. A longer delay for the client to receive an object ✔
- [x] b. A waste of resources such as buffers and variables ✔
- [ ] c. Pipelining has to be used
- [ ] d. Only a single web page can be sent over a single connection

Your answer is correct.

Question **48**

Correct

Marked out of 2.00

Which of the following are used together for identifying a TCP socket?

Select one or more:

- [x] a. Destination IP address ✔
- [x] b. Source port number ✔
- [x] c. Source IP address ✔
- [x] d. Destination port number ✔

Your answer is correct.

Question **49**

Correct

Marked out of 2.00

What are the benefits of web caching?

Select one or more:

- [ ] a. Requested data will be up-to-date
- [x] b. Reduces latency experienced by clients ✔
- [x] c. Lowers bandwidth costs ✔
- [x] d. Reduces network traffic ✔

Your answer is correct.

Question **50**

Correct

Marked out of 2.00

Which of the following statements regarding the domain name system (DNS) are correct?

Select one or more:

- [x] a. The decentralized design of DNS helps to avoid a single point of failure ✔
- [x] b. DNS provides other services such as load distribution in addition to the basic service of resolving hostnames into IP addresses ✔
- [x] c. DNS is commonly used with HTTP and SMTP ✔
- [x] d. DNS servers are organized in a hierarchical fashion to deal with scaling issues ✔

Your answer is correct.

Question **51**

Correct

Marked out of 2.00

What are the major components of TCP congestion control algorithm?

Select one or more:

- [x] a. Additive-increase, multiplicative-decrease ✔
- [x] b. Slow start ✔
- [x] c. Reaction to timeout events ✔
- [ ] d. Fast recovery

Your answer is correct.

Information

All the questions on this page are essay questions.

Question **52**

Complete

Marked out of 6.00

What are the main differences between routing and forwarding?

Forwarding transfers packets hop-by-hop (determines which exits to take on a drive). It is done per-packet. It directs every data packet to an out-going link. Forwarding is done in real time and may be implemented in specialized hardware. Individual router using a forwarding table.

Routing determines the path to take (planning the trip from source to destination). It is generally not done per packet. Forwarding table entries are populated by routing. Routing algorithm is independent of forwarding: compute the paths the packet will follow. Routers talking among themselves (normally between routers). Non-real time: latency up to 2 minutes. It jointly creating the forwarding table.

Question **53**

Complete

Marked out of 8.00

Network address translation (NAT):

1. Please describe the benefits of using NAT.
2. Please use an example to explain how NAT works.
3. What are the main reasons that people object to the use of NAT?

1. 32-bit address space are soon to be completely allocated (ran out of IPv4). Header format helps speed processing/forwarding. Header changes to facilitate Quality of service. IPv6 datagram format has fixed length of 40 byte and no fragmentation => speed up processing, makes router simpler.

2. Example: Tunneling - We put IPv6 datagram as a payload inside IPv4.

3. People object to the use of NAT because IPv6 adoptation is slow: CIDRised address, DHCP and NAT has partially solved IP address shortage problem in the short term.

Question **54**

Complete

Marked out of 4.00

In Go-Back-N protocol, the receiver discards out-of-order packets. It seems to be wasteful. Please try to give some justification for doing so.

Because in Go-Back-N protocol, the receiver is kept to be simple (the receiver only receive in-order packet and when a packet arrive, it will send back an acknowledgement number *n* indicates that the receiver has correctly received all packets up to and including packet *n.) - as known as cummulative ACK. Receiver only keeps track of the next sequence number it needs and store only one packet at a time.*

The receiver is kept to be simple because it assumes that sender will retransmit all packet at later time if the next expected packet for receiver does not arrive in time (when time-out).

Question **55**

Complete

Marked out of 4.00

TCP Flow control and congestion control:

1. What is the main difference between TCP flow control and congestion control?
2. Why do we need both of them?

In flow control, traffic is controlled and traffic represents the flow from sender to receiver (avoid buffer overflow at the receiver). Flow control is a speed-matching service - matching the rate at which the sender is sending against the rate at which the receiver is reading.

In congestion control, traffic is also controlled and traffic represents flow entering into the network (avoid router buffer overflow caused by congestion in the network). Congestion control is not so much a service provided to the application; it is a service to the network as a whole.

◄ Lab test 2019

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