1. In an IPv4 packet header, what does the value in the Internet Header Length signify?
   1. the length of the IPv4 packet
   2. the length of the IPv4 header
   3. the length of the IPv4 header minus options
   4. the length of the IPv4 packet minus options
2. What is the purpose of the Precedence bits in the IPv4 header’s DSCP field?
   1. Precedence is used by routers to prioritize traffic through router queues.
   2. Precedence is used by MTU Discovery to adjust packet size for link MTUs.
   3. Precedence is used by routers to follow a specified path type.
   4. Precedence is used by upper-layer protocols for error checking.
3. Using the DSCP identifier, IPv4 traffic can be prioritized by an end node or boundary device, such as a router, and queued and forwarded according to this value. DSCP EF ensures that routers expedite the packet forwarding and don’t lower the priority value. Of the following, which service most requires DSCP EF?
   1. e-mail
   2. instant messaging
   3. VoIP
   4. Web browsing
4. In an IPv4 Packet header, the Identification field contains a unique identifier for each packet; however, packets are sometimes fragmented further by routers to transverse a network that supports a smaller packet size. What happens to the value of the Identification field in a packet header if the packet is further fragmented?
   1. The unique ID for the packet is maintained, but for each fragment, a suffix is added to the original value.
   2. The unique ID for the packet is maintained, but for each fragment, a prefix is added to the original value.
   3. The unique ID is discarded, and completely new IDs are inserted in the Identification field for each of the fragments of the original packet.
   4. Each fragment of the original packet maintains the original ID value in the header Identification field.
5. The Flags field in an IPv4 header can be set to different values, depending on fragmentation requirements. Of the following, which is correct about the options that can be set in this field?
   1. The values can be set to allow more fragmentation but not to prohibit fragmentation.
   2. The values can be set to prohibit more fragmentation but not to allow further fragmentation.
   3. The values can be set to allow more fragmentation or prohibit more fragmentation, depending on the network’s requirements.
   4. The value can only be set to Reserved (Bit 0), with no other available options.
6. The IPv4 header’s Fragment Offset field is used, if the packet is a fragment, to show where to place the packet’s data when the fragments are reconstructed. True or false?
7. The IPv4’s TTL field indicates the remaining lifetime of the packet defined as distance or as in hops through routers. True or false?
8. The IPv4 Protocol field contains the value of the protocol that is coming next. Of the following, which are valid protocols for this field? (Choose all that apply.)
   1. EGP
   2. ICMP
   3. NAND
   4. OSPF
9. What basic function does the IPv4 Header Checksum field perform?
   1. It provides error detection on the IP header only, minus the Checksum field.
   2. It provides error detection on the contents of the entire IP packet, including the header.
   3. It provides error detection on the contents of the IP header, including the Checksum field itself.
   4. It provides error detection on the contents of the entire IP packet, minus the Checksum field.
10. Which address type can the Source Address field of an IPv4 packet header contain?
    1. anycast
    2. broadcast
    3. multicast
    4. unicast
11. The IPv4 header’s Options field provides additional IP routing controls. What is the boundary where the options must end?
    1. 2-byte boundary
    2. 4-byte boundary
    3. 8-byte boundary
    4. 16-byte boundary
12. For the IPv6 header Traffic Class field, what function does the Precedence field serve?
    1. It allows an application to differentiate traffic types based on priorities.
    2. It allows forwarding routers to distinguish different flows of packets.
    3. It allows upper-layer protocols to insert a value in the Traffic Class field.
    4. It reserves the last 4 bits of the Traffic Class field for DS.
13. Which fields in an IPv6 header do packet classifiers use to identify a packet’s flow if it is part of a flow? (Choose all that apply.)
    1. Destination Address
    2. Flow Label
    3. Hop Limit
    4. Source Address
14. The Next Header field in the IPv6 header points to the first extension header for the packet if the packet possesses one or more extension headers. If more than one extension header exists, how is this extension header identified?
    1. The Next Header field points to the first extension header and then, if others exist, points to the subsequent extension headers.
    2. The Next Header field points to the first extension header and, if others exist, the first extension header uses its own Next Header field to point to the next extension header.
    3. The Next Header field points to the first extension header and, if others exist, they announce themselves using values in their own Next Header fields.
    4. The Next Header field points to the first extension header and, if others exist, the encapsulated higher-level protocol contains a reference to all subsequent extension headers.
15. RFC 2460 defines the recommended order in which extension headers should appear. Which extension header should appear first if it is present?
    1. Authentication
    2. Destination Options
    3. Hop-by-Hop Options
    4. Routing
16. Of the following, which extension header can appear more than once for an IPv6 packet?
    1. Authentication
    2. Destination Options
    3. Hop-by-Hop Options
    4. Routing
17. What is a valid proposed option for the IPv6 Hop-by-Hop Options extension header?
    1. jumbogram large payload options
    2. intermediary addresses options
    3. hop limit options
    4. minimum fragment size options
18. When is the Destination Options extension header encrypted?
    1. when it appears earlier in the packet
    2. when it appears later in the packet
    3. when its value is more than 0
    4. when it appears before the Hop-by-Hop Options field
19. Currently, the Routing extension header is designed to use only one option. Which option can it use?
    1. Routing Address = 0
    2. Routing Next Hop = 0
    3. Routing Preference = 0
    4. Routing Type = 0
20. When is the Fragment extension header used?
    1. when the transmitting device needs to send packets smaller than the PMTU
    2. when the transmitting device needs to send packets larger than the PMTU
    3. when the transmitting device needs to send packets consistent with the PMTU
    4. when the transmitting device needs to send a “Do Not Fragment” message to forwarding routers
21. How does the Authentication extension header specify the true origin of an IPv6 packet?
    1. by containing an encrypted copy of the sending host’s username and password
    2. by preventing address spoofing and connection theft
    3. by possessing a true copy of the IPv6 host address in binary format
    4. by inhibiting data corruption of the ESP extension header
22. A network node that understands the Jumbo Payload option will process a packet as a jumbogram under what condition?
    1. The packet’s header Payload Length field is set to greater than 0.
    2. The Next Header field is set to greater than 0.
    3. The Link-Layer framing indicates that additional octets exist beyond the IPv6 header.
    4. The Fragment extension header is present.
23. Once PMTU Discovery sets the MTU size for IPv6 packets and begins sending, how do forwarding nodes manage packets if a link MTU in the path reduces or becomes too small for the packet MTU size?
    1. The forwarding node drops the packet and sends an ICMPv6 Packet Too Big message to the sending node.
    2. The forwarding node drops the packet and sends an ICMPv6 Resend Packet message to the sending node.
    3. The forwarding node performs PMTU Discovery to locate a path that will accommodate the current MTU size, and then forwards the packet along that path.
    4. The forwarding node changes the value in the Fragment extension header from “Do Not Fragment” to “Fragment Type = 0” and then changes the MTU size to fit the reduced link MTU.
24. When running UDP over IPv6, the checksum is mandatory and a pseudo-header is used to imitate the actual IPv6 header. If the Routing extension header is present, what is the result in the pseudo-header?
    1. The address in the Destination Address field is the final destination address.
    2. The address in the Destination Address field is the one in the IPv6 packet.
    3. The Next Header field contains the value of the upper-layer protocol.
    4. The Upper-Layer Packet Length field contains the length of the upper-layer header plus the associated data.
25. IPv6 packet headers are much larger in size than IPv4 packet headers, even though the IPv6 header structure is less complex. What is the main cause of the size increase?
    1. the larger IPv6 address space
    2. the addition of extension headers
    3. mandatory checksum calculations for IPv6 packet headers using the UDP upperlayer protocol
    4. the Hop Limit field’s measurement of hops as distance rather than time