

IO4041 Introduction to Internet of Things – BSE Spring 2025 – Quiz 3

Roll # _____ Name _____ Section _____

1. What is LoRaWAN?

a) A physical layer modulation technique

b) A communication protocol and system architecture

c) A type of end device

d) A specific frequency band

2. LoRaWAN Class A devices optimize for long battery life by entering ____ mode frequently. This results in ____ downlink latency. Class B attempts to balance this by using periodic ____ slots.

a) transmit, low, sync

b) receive, high, ping

c) sleep, high, ping

d) sleep, low, transmit

3. What is the size of the standard IPv6 header?

a) 20 bytes

b) Variable, depending on options

c) 40 bytes

d) 60 bytes

4. Why was the EUI-64 method seen as having privacy implications, leading to the increased use of randomly generated interface IDs?

a) MAC addresses are easily guessable.

b) It made tracking a specific device across different networks easier.

c) EUI-64 addresses are longer and harder to manage.

d) Random addresses provide better routing efficiency.

5. Contrast the scope and routability of IPv6 Unique Local Addresses (ULAs) and Link-Local Addresses.

a) Both are globally routable.

b) ULAs are intranet routable; Link-Local addresses are not routable at all.

c) Link-Local are routable within the local subnets; ULAs are not routable at all.

d) Both are only routable within the same subnet.

6. Why is it not sufficient to just use IEEE 802.15.4 and 6LoWPAN for a full IoT network? (Select ALL that apply)

a) They do not support encryption

b) They do not define a routing protocol

c) They do include device management

d) They cannot handle IPv6 traffic

7. Which of the following are valid reasons for compressing IPv6 headers in 6LoWPAN? (Select ALL that apply)

a) Minimize data size due to small frame limits

b) Reduce energy usage in transmission

c) Increase encryption strength

d) Enable routing via MAC addresses

8. Which device type in IEEE 802.15.4 can act as a PAN coordinator or router?

a) Reduced Function Device

b) Full Function Device

c) Gateway Device

d) Border Router

9. In the “mesh-under” approach, routing decisions are made at the _____ layer, while in “route-over”, they are made at the _____ layer.

a) Network, Transport

b) Transport, Network

c) Link, Network

d) Application, Link

10. What is the purpose of the mesh addressing header in 6LoWPAN?

a) To compress IPv6 headers

b) To identify routing protocol

c) To carry originator, final destination, and hop-by-hop addresses

d) To encrypt the data payload

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1. Which LoRaWAN device class keeps the receive window open almost continuously, offering low downlink latency but higher power consumption?
 - a) Class A
 - b) Class B
 - c) Class C**
 - d) Class D
2. A company deploys LoRaWAN sensors across a large agricultural area with some hills and buildings. While LoRa doesn't strictly require line-of-sight, what is the most likely impact of these obstructions?
 - a) Increased data rates to compensate.
 - b) Reduced communication range.**
 - c) Mandatory use of Class C devices.
 - d) Inability to use The Things Network.
3. IPv6 removed the _____ field present in the IPv4 header. Instead, it uses a more flexible system called _____, identified by the _____ field.
 - a) checksum, fragmentation, packet id
 - b) options, extension headers, next header**
 - c) options, next header, extension headers
 - d) flow label, hop limit, TTL
4. In IPv6, where is packet fragmentation performed?
 - a) By any router along the path
 - b) Only by the destination node
 - c) Only by the source node**
 - d) By both source and intermediate routers
5. Which of the following is NOT a service provided by the 6LoWPAN adaptation layer?
 - a) Packet fragmentation
 - b) IPv6 tunneling**
 - c) Header compression
 - d) Mesh networking

6. Why is a special adaptation layer required in 6LoWPAN?

a) To improve Wi-Fi connectivity

b) Because IPv6 headers are too large for 802.15.4 frames

c) To encrypt data using AES

d) To support IPv4 devices

7. What protocol stack, built upon 6LoWPAN and IEEE 802.15.4, provides features like routing, network management, and security for IoT mesh networks?

a) Zigbee

b) LoRaWAN

c) Thread

d) Bluetooth Mesh

8. The IEEE 802.15.4 standard specifies a maximum frame size of 127 bytes. What are the primary reasons cited for this design constraint? (Select ALL that apply)

a) To maximize data throughput.

b) To accommodate limited buffer memory in low-resource devices.

c) To reduce the likelihood of transmission errors

e) To ensure compatibility with IPv4 MTU sizes.

9. Which header is always present in a 6LoWPAN encapsulated frame?

a) Mesh addressing header

b) Fragmentation header

c) IPv6 Header compression (IPHC)

d) None (depends on need)

10. Which of the following are possible uses of 6LoWPAN? (Select ALL that apply)

a) Smart grid

b) Home automation

c) High-definition video streaming

d) Machine-to-machine (M2M) communication