

Roll # \_\_\_\_\_ Name \_\_\_\_\_ Section \_\_\_\_\_

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| <p>1. What is LoRaWAN?</p> <ul style="list-style-type: none"><li>a) A physical layer modulation technique</li><li><b>b) A communication protocol and system architecture</b></li><li>c) A type of end device</li><li>d) A specific frequency band</li></ul> <p>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.</p> <ul style="list-style-type: none"><li>a) transmit, low, sync</li><li>b) receive, high, ping</li><li><b>c) sleep, high, ping</b></li><li>d) sleep, low, transmit</li></ul> <p>3. What is the size of the standard IPv6 header?</p> <ul style="list-style-type: none"><li>a) 20 bytes</li><li>b) Variable, depending on options</li><li><b>c) 40 bytes</b></li><li>d) 60 bytes</li></ul> | <p>4. Why was the EUI-64 method seen as having privacy implications, leading to the increased use of randomly generated interface IDs?</p> <ul style="list-style-type: none"><li>a) MAC addresses are easily guessable.</li><li><b>b) It made tracking a specific device across different networks easier.</b></li><li>c) EUI-64 addresses are longer and harder to manage.</li><li>d) Random addresses provide better routing efficiency.</li></ul> <p>5. Contrast the scope and routability of IPv6 Unique Local Addresses (ULAs) and Link-Local Addresses.</p> <ul style="list-style-type: none"><li>a) Both are globally routable.</li><li><b>b) ULAs are intranet routable; Link-Local addresses are not routable at all.</b></li><li>c) Link-Local are routable within the local subnets; ULAs are not routable at all.</li><li>d) Both are only routable within the same subnet.</li></ul> |
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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

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

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| <p>1. Which LoRaWAN device class keeps the receive window open almost continuously, offering low downlink latency but higher power consumption?</p> <ul style="list-style-type: none"><li>a) Class A</li><li>b) Class B</li><li><b>c) Class C</b></li><li>d) Class D</li></ul> <p>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?</p> <ul style="list-style-type: none"><li>a) Increased data rates to compensate.</li><li><b>b) Reduced communication range.</b></li><li>c) Mandatory use of Class C devices.</li><li>d) Inability to use The Things Network.</li></ul> | <p>3. IPv6 removed the _____ field present in the IPv4 header. Instead, it uses a more flexible system called _____, identified by the _____ field.</p> <ul style="list-style-type: none"><li>a) checksum, fragmentation, packet id</li><li><b>b) options, extension headers, next header</b></li><li>c) options, next header, extension headers</li><li>d) flow label, hop limit, TTL</li></ul> <p>4. In IPv6, where is packet fragmentation performed?</p> <ul style="list-style-type: none"><li>a) By any router along the path</li><li>b) Only by the destination node</li><li><b>c) Only by the source node</b></li><li>d) By both source and intermediate routers</li></ul> <p>5. Which of the following is NOT a service provided by the 6LoWPAN adaptation layer?</p> <ul style="list-style-type: none"><li>a) Packet fragmentation</li><li><b>b) IPv6 tunneling</b></li><li>c) Header compression</li><li>d) Mesh networking</li></ul> |
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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**