EIoT 2020L – Final TEST (1)

Name and Surname:

# IEEE 802.15.4 and IPv6 address translation – 10 points

For the 802.15.4 MAC address AA:BB:CC:DD:EE:FF:00:11, generate an IPv6 site-local following the Stateless Address Autoconfiguration (SLAAC) procedure for 6LoWPAN. You shall choose valid site-local prefix for the IPv6 address.

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# Modulation – 10 points

Complete the table below. Fill in the description, modulation name AND provide an example of such technology, if not given in the table.

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| Description | Modulation Name | Example of Wireless Technology using it |
| Uses wideband linear frequency modulated chirp pulses to encode information, where a chirp is a sinusoidal signal of frequency increase or decrease over time |  |  |
|  | Frequency Shift Keying |  |
|  |  | WiFi |

# IPv6 and Neighbour Discovery Protocol (NDP) – 10 points

### For the network topology below, provide a message sequence chart of the communication involving NDP messages. Assume Node C already has configured its global IPv6 address and prefix, and Nodes A and B have not yet. You should include all message types: Neighbour Solicitation, Neighbour Advertisement, Router Solicitation, and Router Advertisement.

Node A Node B Node C

# LR-WPAN modes – 10 points

Specify in each scenario whether a “*non-beacon enabled*”, “*beacon-enabled with no synchronization*”, “*beacon enabled with synchronization*” or “*beacon-enabled with guaranteed time slots*” should be used depending on the provided application requirement.

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| Application requirement | Suggested LR-WPAN mode |
| End-devices are battery-operated. All other devices can be powered continuously (no battery). Application running on end-devices must send immediately measurements, but it can tolerate large delays in receiving data from the cloud. |  |
| All devices are battery-operated. A minimum delay in frame transmission from and to each device is tolerated. |  |

# IoT Architectures – 10 points

Specify the minimum level of integration, given the end-user requirement for the solution.

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| End-user requirement | Minimum level of integration |
| Not every node must have a sensor and an actuator. It pays-off to have nodes with different capabilities. |  |
| Connectivity with internet is not stable, but a complex set of decisions must be taken promptly taken into account data distributed among several nodes |  |
| Connectivity to the internet is very costly. |  |
| There is a high correlation in the data collected by different nodes. A centralized point for data analysis is needed. |  |

# Single-choice Multiple-options Questions – 50 points

1. The number of addresses of ipv4 and ipv6 are
   1. 232 and 264
   2. 216 and 2128
   3. 232 and 2128
2. What is the maximum data rate of LoRa and its payload size?
   1. 50kbps and 230 bytes
   2. 11kbps and 123 bytes
   3. 1Mbps and 256 bytes
3. Which type of the CoAP message can carry a coap REQUEST?
   1. RST
   2. NON
   3. ACK
4. Which part of The CoAP message contains the path part of the resource‚s URI?
   1. Header
   2. Token
   3. Options
   4. Payload
5. In which control packets is the Keep Alive field present ?
   1. Publish
   2. Connect
   3. Disconnect
   4. PingReq