NPTEL Online Certification Courses

Indian Institute of Technology Kharagpur

Introduction to Internet of Things Assignment- Week 3

TYPE OF QUESTION:MCQ/MSQ

Number ofquestions:15 **Total marks: 15 X 1= 15**

QUESTION 1:

Layer "X" incorporates channel hopping and channel blacklisting to increase reliability and security. What is "X"?

a. HART Physical layer
b. HART Data Link layer
c. HART Network layer
d. HART Transport layer

Correct Answer: b. HART Data Link layer

Detailed Solution:HART Data link layer, derived from the IEEE 802.15.4 standard, incorporates channel hopping and channel blacklisting to increase reliability and security.
See lecture 11@ 07:25

QUESTION 2:

The transmission in HART is synchronized using ____ slots.

a. 100 microseconds
b. 100 milliseconds
c. 10 milliseconds
d. 10 microseconds

Correct Answer: c. 10 milliseconds

Detailed Solution: In order to control congestion in HART, transmissions are synchronized using 10 milliseconds slots.
See lecture 11@ 11:50

QUESTION 3:

For control applications, which of the following ISA 100.11A usage classes are defined?

a. Class 0
b. Class 1&2
c. Class 1,2&3

d. Class 4&5

Correct Answer: c. Class 1,2&3

Detailed Solution: Usage classes 1,2&3 are defined for control applications. 1: closed loop regulatory control; 2: closed loop supervisory control; 3: open loop control.
See lecture 13@ 19:20

QUESTION 4:

The deterministic communication in Data Link Layer of HART is achieved by _____

a. Channel hopping
b. Channel blacklisting
c. Super-frames
d. Modulation

Correct Answer: c. Super-frames

Detailed Solution: Collison-free and deterministic communication in HART Data Link Layer achieved by super-frames and TDMA.
See lecture 11@ 6:30

QUESTION 5:

What does ISA stand for in ISA 100.11A?

a. International Society of Automation
b. Industrial Society of Automation
c. International Standards of Automation
d. Industrial Standards of Automation

Correct Answer: a. International Society of Automation

Detailed Solution:ISA100.11A is a wireless networking technology standard developed by the International Society of Automation (ISA).

See lecture 13@ 14:30

QUESTION 6:

"Hop selection" is supported by _____ in Bluetooth technology.

a. Baseband layer
b. L2CAP
c. Both (a) and (b)
d. None of the above

Answer: a. Baseband layer

Detailed Solution: The baseband layer of Bluetooth protocol stack supports services like error correction, data whitening, hop selection, and security.
See lecture 12@11:15

QUESTION 7:

Which of the following is NOT a scheme for re-establishing the connectivity between dumb nodes with other nodes in a wireless sensor networks?

a. CoRD
b. CaRD
c. CoRAD
d. None of the above

Correct Answer: b. CaRD

Detailed Solution: CoRD and CoRAD are the schemesfor re-establishing the connectivity between dumb nodes with other nodes in a wireless sensor networks.
See lecture 15@ 10:50

QUESTION 8:

Which of the following technology does not use the standard 2.4 GHz ISM band?

a. ZigBee
b. Bluetooth
c. NFC
d. 6LowPAN

Correct Answer: c. NFC

Detailed Solution: NFC utilizes 13.56 MHz frequency of the ISM band.

QUESTION 9:

WirelessHART Network Manager handles _____-based network security.

a. Code
b. Collision
c. Time
d. Access

Correct Answer: a. code

Detailed Solution: WirelessHARTnetwork manager handles code-based network security and prevents unauthorized nodes from joining the network.
See lecture 11@ 13:08

QUESTION 10:

How many power-saving modes are there in Bluetooth technology?

a. One
b. Two
c. Three
d. Four

Correct Answer: c. Three

Detailed Solution: There are three power-saving modes in Bluetooth technology, namely, sniff, hold, and park.
See lecture 12@ 07:35

QUESTION 11:

Which layer provides protocol multiplexing capability?

a. Physical layer
b. Data link layer
c. Middleware layer
d. Application layer

Correct Answer: b. Data link layer

Detailed Solution: Logical link control and adaptation protocol (L2CAP) provides protocol multiplexing capability, which resides in the Data Link Layer.
See lecture 12@ 12:20

QUESTION 12:

What does RF4CE stand for in “ZigBee RF4CE”?

a. Radio Frequency for Consumer Electronics
b. Radio Frequency 4.0 Consumer Electronics
c. Radio Frequency for Controlled Environment
d. Radio Frequency 4.0 Controlled Environment

Correct Answer: a. Radio Frequency for Consumer Electronics

Detailed Solution: ZigBee RF4CE (Radio Frequency for Consumer Electronics) is a subset of ZigBee 3.0, developed to replace the infrared remote controls for consumer electronics (TVs, stereos) with radio-based controls.
See lecture 11@ 16:00

QUESTION 13:

NFC tags found in supermarket products are examples of _____ NFC.

a. Active
b. Passive
c. Both (a) and (b)
d. None of the above

Correct Answer: b. Passive

Detailed Solution: NFC tags found in supermarket products are passive devices. The smartphones are examples of active devices.
See lecture 11@ 16:40

QUESTION 14:

Which of the following utilizes Manchester channel encoding?

a. ZigBee
b. NFC
c. Zwave
d. None of the above

Correct Answer: c. Zwave

Detailed Solution: Zwave utilizes GFSK modulation and Manchester channel encoding.
See lecture 13@ 06:50

QUESTION 15:

What are the constraints on sensor nodes?

a. Dispensable
b. Autonomous
c. Low power consumption
d. All of these

Correct Answer: d. All of these

Detailed Solution: Any sensor node must be of small size, consuming low power, and be dispensable, autonomous, and adaptive to the environment.
See lecture 14@ 15:30

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