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Continuing Education Course #410
Understanding Sensors Part 2
Sensor Networks

1. MEMS is an acronym for?
- a. miniature electronic micro-system
- b. micro electro-mechanical systems
- c. modular electronic mini-sensor

2. Key MEMS sensors include?
- a. accelerometers and gyros
- b. pressure
- c. both A and B

3. MEMS sensing techniques include?
- a. piezoresistive, piezoelectric, and capacitive
- b. temperature
- c. pressure

4. Typical quantities sensed by MEMS sensors include?
- a. piezoresistive
- b. piezoelectric
- c. pressure, temperature, strain, force, rate and displacement

5. Fiber sensors sensing techniques can be categorized into three types, which are?
- a. intensity modulated, phase modulated, wavelength modulated
- b. temperature, pressure, rate
- c. vibration, strain, position displacement

6. The sensor system within a network is termed?
- a. a data device
- b. a sensor node
- c. a detector

7. WSN in an acronym for?
- a. Wired System Net
- b. Wired Sensor Net
- c. Wireless Sensor Network

8. The most common signal transmission medium used in a wireless network is?
- a. Radio frequency (RF) transmission
- b. laser
- c. sound waves

9. Types of network topologies include?
- a. tree, mesh, ring, circular, grid
- b. point to point, bus, star
- c. both A and B

10. A open architecture telecommunication system model used for protocol design is?
- a. open systems interconnection (OSI)
- b. open systems network (OSN)
- c. network system protocol (NSP)

11. Another often used telecommunication systems models used in internet protocol design is?
- a. open system network (OSN)
- b. transmission control protocol/internet protocol (TCP/IP)
- c. network system protocol (NSP)

12. The telecommunication model protocols are designed in what type of structure?
- a. net
- b. block
- c. layered

13. The communication protocol model closest to that required for a WSN is?
- a. TCP/IP
- b. OSI
- c. NSP

14. The telecommunication model example for an WSN had how many layers?
- a. eight
- b. five
- c. three

15. The telecommunication model example for an WSN which is the highest layer?
- a. transport
- b. physical
- c. application

16. The telecommunication model example for an WSN which is the lowest layer?
- a. transport
- b. physical
- c. application

17. Sensor fusion is a term that covers a number of methods and algorithms, including?
- a. central limit theorem, Kalman Filter, Bayesian networks
- b. Dempster-Shafer algorithm, convolutional neural networks, artificial intelligence
- c. both A and B

18. What type of network is ideal for predicting the likelihood of several possible causes being the contributing factor of an event that has occurred?
- a. electronic network
- b. Kalman network
- c. Bayesian network

19. Bayes rule is based on?

○ a. electronic network theory
○ b. joint probability
○ c. the Kalman filter

20. For the room access and presence security system example what data fusion method was used?
○ a. Bayesian network
○ b. Artificial Intelligence
○ c. Kalman filter

21. The room access and presence security system is an adaptive system design and the architecture was composed of how many functional blocks?
○ a. five
○ b. seven
○ c. three

22. Inertial navigation systems (INS) use what type of filter for inertial sensor fusion?
○ a. Kalman Filter
○ b. low pass filter
○ c. Butterworth Filter

23. Inertial navigation systems use what type of sensors for inertial sensor fusion?
○ a. temperature and pressure
○ b. flow and level
○ c. IMU with 3 gyros and 3 accelerometers and GPS

24. The autonomous vehicle fuses what sensor data to obtain the best situational awareness map it can about a vehicle.
○ a. temperature and pressure
○ b. LIDAR, RADAR, camera
○ c. strain and vibration

25. The autonomous vehicle can use what kind of dedicated short-range communication (DSCR) link for increased safety and reduced traffic congestion.
○ a. Vehicle to everything (V2X)
○ b. Laser communication link
○ c. LIDAR