1. Which software or application can be classified as a cyber-physical system? **1 point**

- (●) Software that uses sensors to detect errors in the execution of a physiotherapeutic exercise and provides tactile feedback to improve the execution of the exercise
- ( ) A mobile application that creates a list of items to be bought by participants
- ( ) A health monitoring application that senses ECG signals and sounds an alarm if it detects bradycardia
- ( ) A mobile application that uses sensors to monitor physical activity and makes diet recommendations

2. Which statement is *most* accurate about cyber-physical systems? **1 point**

- ( ) All cyber-physical systems have IoT at the backend.
- ( ) Distributed cyber-physical systems are only possible in the presence of IoT architecture.
- ( ) IoT is only needed for development of CPS.
- (●) All cyber-physical systems are control systems.

3. Which statements are true? *(Select all that apply.)* .75 **1 point**

- [x] As we go from sensor to edge to fog to cloud network, uncertainty in resource availability increases.
- [x] Context rich data is available at the sensor and edge devices.
- [x] Pre-trained ML systems can be stored in fog to enable real time execution of IoT applications.
- [x] As we go from cloud network to fog to edge to sensors, we have less and less data security.

4. What are some of the challenges for developing smart grids? *(Select all that apply.)* .5 **1 point**

- [x] Integration of energy harvesting techniques may end up harming the environment.
- [x] Installing sensors in every line of the smart grid is costly.
- [x] Storing and distributing harvested energy that is returned to the grid requires toxic batteries that may have a high carbon footprint.
- [x] Installing solar panels is expensive, and maintaining them is difficult.

5. Where can middleware be implemented? *(Select all that apply.)* **1 point**

- [x] In the cloud
- [x] In a sensor
- [x] In the edge
- [x] In the fog

6. What is the **best way** to give IP addresses to sensors in an IoT architecture? **1 point**

- ( ) There is no need for IP addresses because sensors can communicate to the cloud through bluetooth.
- ( ) Install a server in each sensor so that they can communicate using TCP IP.
- ( ) Change the radio of each sensor to support IP protocol.
- (●) Establish edge devices as TCP IP gateways for sensors.

7. According to the **TinyLink: A Holistic System for Rapid Development of IoTApplications** article, why do the authors' hardware configuration generator produce a multi-objective integer linear program? **1 point**

- ( ) Although they are choosing among only a given set of hardware configurations with the objective of reducing pinouts and cost, they should have combined their objective function to only a single objective.
- ( ) Although the generator produces a multi-objective integer linear program, the authors should have combined their objective functions to a single one, which would make their problem easier to solve.
- ( ) Although the generator produces a multi-objective integer linear program, the authors should have solved it as a linear program because all their constraints are linear.
- (●) They are choosing among only a given set of hardware configurations with the objective of reducing pinouts and cost.

8. According to the *TinyLink: A Holistic System for Rapid Development of IoTApplications* article, how does TinyLink generate application code for IoT? **1 point**

- ( ) By using a cross compiler
- ( ) By manually writing a library of functions
- ( ) By using machine learning based code finder
- (●) Through polymorphic APIs

9. We have discussed that device availability is a significant problem for IoT. What are the primary reasons for this problem? *(Select all that apply.)* **1 point**

- [x] IoT devices are often mobile and hence can change context very fast.
- [x] Resources available in IoT devices are not guaranteed because these are not dedicated systems.
- [ ] IoT devices always operate offline.
- [ ] All computing devices are inherently unreliable.

10. Why is resource prediction important in IoT-based applications? **1 point**

- (•) Resource prediction prevents application failure by proactively doing device recruitment.
- ( ) Resource prediction enables faster application execution by proactively running code that may be required in the future.
- ( ) Resource prediction powers devices in IoT by using energy harvesting sources.
- ( ) None of the above