

International Institute of Information Technology - Hyderabad
EC3.202a Embedded System Workshop
Final Exam (Monsoon 2022 - H1)
22 September 2022 (11 am - 12.30 pm)

- Number of questions: 4; Total points: 30; Time Limit: 90 minutes.
- Use of calculator is NOT permitted.
- This is a closed book exam.
- Write all answers in the answer sheet only. Do not write or mark anything on the question paper.
- Read the questions and marking scheme for each question properly.

1. **Multiple Choice Question;** Negative marking: 1 point per correct answer; -0.5 per wrong answer; 0 for not attempting! (Total: 10 points)

- Identify the element, which is not considered in the information security triad
(A) Authenticity (B) Integrity (C) Availability (D) Confidentiality
- An asymmetric-key cipher uses
(A) 1 key (B) 2 keys (C) 3 keys (D) 4 keys
- In which category does compromising confidential information fall?
(A) Vulnerability (B) Attack (C) Threat (D) Bug
- Which of the following is/are offered by the Hash functions?
(A) Authentication (B) Nonrepudiation (C) Data Integrity (D) All of the above
- The *transducer* term can be used for
(A) Sensor (B) Actuator (C) Both (A) and (B) (D) None of the above
- Arrange in the order of lower to higher latency for LoRaWAN classes A, B, and C?
(A) A, B, C (B) C, B, A (C) C, A, B (D) B, A, C
- You cannot establish your own network in
(A) LoRaWAN (B) 3G (C) Both LoRaWAN and 3G (D) WiFi

- viii. Overhearing is a major issue in
(A) Channel partitioning protocols (B) Random assignment protocols
(C) Both (A) and (B) (D) None of the above
- ix. Which one of the following is the best physical layer technology for all IoT applications?
(A) LoRaWAN (B) Cellular (C) WiFi (D) Depends on the application
- x. Mesh topology is not possible in
(A) BLE (B) Zigbee (C) LoRaWAN (D) WiFi
2. **True or False (With Reasoning):** 1 mark per bit only if both the statement (T/F) and reasoning are right; 0 otherwise (Total: 5 points)
- ☒ i. Simple sensors such as temperature, CO, and light do not reveal any privacy data.
 - ☒ ii. In CDMA, different users can transmit on the same frequency and time, but it is still a fixed assignment protocol.
 - ☒ iii. NB-IoT is backward compatible with LTE Cat-0.
 - ☒ iv. IEEE 802.11ah is not backward compatible.
 - ☒ v. Data rates increase with increasing spreading factor in LoRaWAN.
3. **Describe different random assignment protocols:** Aloha, Slotted aloha, ~~CSMA~~, ~~CSMA-CD~~, and ~~CSMA-CA~~. (5 points)
4. **This question is regarding the lab project you are doing in this course. Write the title of your project and answer following questions (Total: 10 points)**
- ☒ (a) **Motivation and Introduction:** What is the motivation for your project? State and briefly explain the problem statement. (2 points)
 - ☒ (b) **Selection of components:** Explain which microcontroller, sensors, actuators, communication technology, and any other hardware will be required to develop the desired system. Clearly explain the rationale/reason behind selecting every component. (2 points)
 - ☒ (c) **Block diagram of the hardware:** Along with a functional block diagram (explain your IoT-based approach, including hardware and software. What were other possible options, and why are you using this approach over other possible approaches?) (2 points)
 - ☒ (d) **Flow Chart:** Draw a neat flow chart of the complete system operation. You might want to include any other system details not covered in the above steps in this flow chart. (2 points)
 - ☒ (e) **Dashboard:** With the help of a block diagram, explain the implementation of the dashboard and its functionalities? (2 points)