



# Institute of Information Technology

Jahangirnagar University

Professional Masters in IT

2nd Trimester Final Examination, Summer 2023

Duration: 3 Hours

Full Marks: 60

Course Code: PMIT – 6223

Course Title: IoT and Fog Computing

Do not write anything on the question paper.

There are 7 (Seven) questions. Answer any 5 (Five) of them.

Figures in the right margin indicate marks.

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|----|----|--|---|
| 1. | a) | Define the internet of things. Briefly explain the evolution of internet of things from the pre-internet era. Also list their key features.                                      | 6 |
|    | b) | Explain the technological roadmap of internet of things. Also describe the relation between the internet of things and big data.   | 6 |
| 2. | a) | Explain how the internet of things helps to develop the autonomous car. Also describe the role of internet of things for connecting roadways.                                    | 6 |
|    | b) | Define the internet of things' trustworthiness. Does the inclusion of the mist layer in the internet of things architecture increase the trustworthiness? Explain your response. | 6 |
| 3. | a) | Describe the characteristics of the following components with their applications: (i) Transducer, (ii) Sensor and (iii) Actuator.  | 6 |
|    | b) | Explain how the Poisson's ratio and gage factor can be used to determine the resistance of a wire.   | 4 |
|    | c) | Sketch a diagram to show the typical electronic sensor system.   | 2 |
| 4. | a) | List the characteristics of fog-computing.   | 2 |
|    | b) | Describe the differences between the five-layered IoT architecture and the fog-based IoT architecture.   | 5 |
|    | c) | Using a suitable block diagram, explain the policy framework of fog computing application in internet of thing.  | 5 |
| 5. | a) | Explain the data dissemination and data gathering process in a wireless sensor network. Also discuss the goals and the performance metrics of data gathering algorithms.         | 6 |
|    | b) | Calculate the delay involved in reaching a message to a base station using PEGASIS. How the delay can be reduced? Explain the process and justify your answer.                   | 6 |
| 6. | a) | Write a short note the Zigbee alliance. Also mention its advances.   | 6 |
|    | b) | Describe the characteristics of IEEE 802.15.4 MAC. Sketch the MAC frame format of IEEE 802.15.4 and briefly explain each attribute of the MAC frame.                             | 6 |
| 7. | a) | State the important characteristics of WSN.  | 3 |
|    | b) | Discuss in detail the design principles for Internet of Things system considering an example that you are asked to design for air quality monitoring in Dhaka City.              | 9 |