



Strathmore
UNIVERSITY

**FACULTY OF INFORMATION TECHNOLOGY
BACHELOR OF SCIENCE IN COMPUTER NETWORK SECURITY
END OF SEMESTER EXAMINATION
CNS 3206: EMBEDDED SYSTEMS & INTERNET OF THINGS**

DATE: 13th December 2023

Time: 10:30-12:30 Hours

Instructions

1. This examination consists of **FIVE** questions.
2. Answer **Question ONE (COMPULSORY)** and any other **TWO** questions.

Question One [30 Marks]

- a) Explain the term Internet of Things (IoT) in the context of Computer Science. **[3 Marks]**
- b) Explain why NoSQL databases is the best suit for most IoT-based solutions. **[3 Marks]**
- c) Describe the difference between an embedded system and distributed embedded system. **[4 Marks]**
- d) Using examples, discuss the difference between RISC and CISC strategies. **[10 Marks]**
- e) As an IoT expert, describe at least 3 processor characteristics that may influence your choice of a specific micro-controller. **[10 Marks]**

Question Two [15 Marks]

- a) Explain why most micro-controller manufacturers prefer RISC over CISC strategy for their products. **[5 Marks]**
- b) Describe at least 5 interfacing requirements for interfacing sensors to micro-controller units. **[10 Marks]**

Question Three [15 Marks]

- a) Explain why the TCP/IP protocol stack is preferred over the OSI protocol stack when describing IoT protocols. **[3 Marks]**
- b) Explain the difference between a protocol and standard in the context of Computer Science. **[3 Marks]**
- c) Using examples, describe at least 3 IoT protocols at the data link layer within the TCP/IP protocol stack. **[9 Marks]**

Question Four [15 Marks]

- a) Describe the term “*Control Network Interface*” in the context of distributed embedded systems. **[3 Marks]**
- b) Using an example, explain what a “*Control Area Network*” is. **[3 Marks]**
- c) Using examples, describe at least 3 protocols associated with distributed embedded systems. **[9 Marks]**

Question Five [15 Marks]

- a) Using examples, discuss at least 5 societal issues that come with the adoption of Big Data by governments. **[10 Marks]**
- b) Explain possible solutions to the issues highlighted in the previous question. **[5 Marks]**