



Strathmore
UNIVERSITY

**FACULTY OF INFORMATION TECHNOLOGY
BACHELOR OF SCIENCE IN COMPUTER NETWORK SECURITY
END OF SEMESTER EXAMINATION
CNS 3206/BTC 3214: EMBEDDED SYSTEMS & INTERNET OF THINGS**

DATE: 9th December 2022

Time: 2 Hours

Instructions

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

Question One [30 Marks]

- a) Using examples, illustrate the significance of sensors and actuators to IoT solutions. **[4 Marks]**
- b) Describe at least 5 sources of IoT data. **[5 Marks]**
- c) Using examples, explain the difference between an embedded system and an IoT application. **[6 Marks]**
- d) As an embedded systems designer, discuss at least 5 issues that you may deal with when interfacing an actuator to a micro-controller. **[10 Marks]**
- e) For each of the 5 issues in Part (d), describe a possible solution. **[5 Marks]**

Question Two [15 Marks]

- a) Explain the significance of a breadboard in the design of embedded systems. **[5 Marks]**
- b) Discuss at least 5 types of network topologies that can be adopted by an embedded system's designer. **[10 Marks]**

Question Three [15 Marks]

- a) Explain at least 5 components of a Node-RED editor. **[5 Marks]**
- b) Using examples, describe the IoT protocol stack. **[10 Marks]**

Question Four [15 Marks]

- a) Using a real-world example, explain the steps and tools that may be taken and used by an embedded system's designer to develop an electronic circuit prototype. **[7 Marks]**
- b) Discuss at least 4 features of the Node-RED tool that make it suitable for designing IoT applications. **[8 Marks]**

Question Five [15 Marks]

- a) Explain the concept of IoT analytics. **[1 Mark]**
- b) Using examples, discuss 3 types of IoT analytics. **[6 Marks]**
- c) Using examples, differentiate between CISC and RISC CPU strategies. **[8 Marks]**