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*(Knowledge for Development)*

## **KIBABII UNIVERSITY**

### **UNIVERSITY EXAMINATIONS 2021/2022 ACADEMIC YEAR**

### **SPECIAL/SUPPLEMENTARY EXAMINATIONS YEAR THREE SEMESTER ONE**

### **FOR THE DEGREE OF BACHELOR OF SCIENCE IN COMPUTER SCIENCE**

**COURSE CODE : CSC371E**  
**COURSE TITLE : REAL TIME SYSTEMS**

**DATE: 16/11/2022 TIME: 08:00 A.M – 10:00 A.M**

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**INSTRUCTIONS TO CANDIDATES**  
**ANSWER QUESTIONS ONE AND ANY OTHER TWO.**

**QUESTION ONE (COMPULSORY) [30 MARKS]**

- a) Define data aggregation as used in WSN's. [1mark]
- b) With the aid of a diagram, describe the WSN protocol stack [10marks]
- c) Briefly give the characteristics of Analog and digital sensors [5marks]
- d) Differentiate between Sensor management protocol and Sensor query and data dissemination protocol. [4marks]
- e) Compare and contrast ad-hoc networks and wireless sensor networks. [6marks]
- f) Differentiate between Structured and Randomized Deployment of WSN's [4marks]

**QUESTION TWO [20 MARKS]**

- a) Using an illustration, discuss the Wireless Sensor Network Architecture [10marks]
- b) State any three characteristics of WSN's [3marks]
- c) Describe the Zigbee network as used in WSN's [7marks]

**QUESTION THREE [20 MARKS]**

- a) Describe five challenges of sensor networks. [10marks]
- b) State and explain Five Factors influencing WSN design. [10marks]

**QUESTION FOUR [20 MARKS]**

- a) As a WSN expert, discuss which of the two main wireless standards is better for use in WSN i.e. 802.15.4 and Zigbee. [10marks]
- b) Describe any three areas that WSN could be majorly applied in future. [6marks]
- c) State and explain any four application areas of wireless sensor Networks. [4marks]

**QUESTION FIVE [20 MARKS]**

- a) Discuss medium access control protocols for wireless sensor networks. [10marks]
- b) Sensor nodes have several components inbuilt within them. Explain the following [5marks]
- a. components:
  - b. Sensing Unit
  - c. Processing Unit
  - d. Transceiver Unit
  - e. Power Unit
- c) The routing protocols define how nodes will communicate with each other and how the information will be disseminated through the network. Discuss the two types of *Classifications of routing protocols*. [5 Marks]