



(Knowledge for Development)

KIBABII UNIVERSITY

UNIVERSITY EXAMINATIONS 2020/2021 ACADEMIC YEAR

SPECIAL/SUPPLEMENTARY EXAMINATIONS YEAR FOUR SEMESTER ONE EXAMINATIONS

FOR THE DEGREE OF BACHELOR OF COMPUTER SCIENCE

COURSE CODE : CSC 472E

**COURSE TITLE : WIRELESS SENSOR
NETWORKS**

DATE: 12/01/2022

TIME: 08:00 A.M – 10 :00 A.M.

INSTRUCTIONS TO CANDIDATES

ANSWER QUESTIONS ONE AND ANY OTHER TWO

QUESTION ONE [COMPULSORY] [30 MARKS]

- a) What types of information does a wireless network support? [4 marks]
- b) What are the four types of wireless networks? [4 marks]
- c) Discuss the following terms as used in WSNs.
- i. Sensor Protocols for Information via Negotiation (SPIN) [2 marks]
 - ii. Directed Diffusion (DD) [2 marks]
 - iii. Rumor Routing (RR) [2 marks]
- d) Sensor nodes are employed in various application dependent events that need constant observance and detection. Identify at least six of these applications. [6 marks]
- e) Discuss the significant design issues required for consideration to meet WSNs diversification today. [6 marks]
- f) Describe four important features for Hybrid, Energy-Efficient Distributed Clustering (HEED) protocol. [4 marks]

QUESTION TWO [20 MARKS]

- a) Differentiate between Coherent-based and Non-Coherent-based routing protocols based on protocol operation. [3 marks]
- b) Discuss the following wireless sensor network routing protocols.
- i. Flat Routing [3 marks]
 - ii. Hierarchical Routing [4 marks]
 - iii. Location-based [4 marks]
- c) Identify three advantages of Threshold sensitive energy-efficient sensor network (TEEN) Protocol. [6 marks]

QUESTION THREE [20 MARKS]

- a) State the challenges in the design of middleware for WSNs. [4 marks]
- b) Describe the basic middleware functions for WSNs. [4 marks]
- c) Discuss the following existing middleware.
- i. Middleware Linking Applications and Networks (MiLAN) [3 marks]
 - ii. Internet-Scale Resource-Intensive Sensor Networks Services (IrisNet) [3 marks]
 - iii. Adaptive Middleware Framework (AMF) [3 marks]
 - iv. Data Service Middleware (DSWare) [3 marks]

QUESTION FOUR [20 MARKS]

- a) Discuss directional antenna for Ad hoc networks. **[5 marks]**
- b) Discuss the following traditional network management models
 - i. Simple Network Management Protocol **[8 marks]**
 - ii. Telecom Operation Map **[7 marks]**

QUESTION FIVE [20 MARKS]

- a) What are examples of applications for wireless WANS? **[4 marks]**
- b) Why is it that network management is much more important for WSNs than for traditional networks? **[4 marks]**
- c) Network management functions should consider all the special features of WSNs. Describe some of these considerations. **[6 marks]**
- d) Although the traditional hierarchical naming approaches can be used for wireless sensor networks, those approaches are not efficient compared with application oriented low-level naming. Discuss the advantages of application oriented low-level naming. **[6 marks]**