(Knowledge for Development)

KIBABII UNIVERSITY

(KIBU)

UNIVERSITY EXAMINATIONS
2021/2022 ACADEMIC YEAR

END OF SEMESTER EXAMINATIONS
YEAR FOUR SEMESTER II EXAMINATIONS

FOR THE DEGREE OF
BACHELOR OF SCIENCE
(COMPUTER SCIENCE)

COURSE CODE: CSC 475

COURSE TITLE: ADVANCED WIRELESS & MOBILE NETWORKS

DATE: 29/08/2022   **TIME:**   02.00 P.M – 04.00 P.M

INSTRUCTIONS TO CANDIDATES

ANSWER QUESTION ONE and ANY OTHER TWO QUESTIONS

QUESTION ONE (COMPULSORY) [30 MARKS]

a. The technical issues in WLANs must be understood in order to appreciate the difference between wired networks and wireless networks and so the types of WLANS, their components and their basic functionalities are also detailed. Explain three uses of WLAN

[3 marks]

b. State two advantages and two disadvantages of Satellite Communications **[4 marks]**

c. The communication between processes can be seen as a method of co-operation between them and Processes can communicate with each other using two ways: Name and explain them. **[4 marks]**

d. An access point is a device that creates a wireless local area network, or WLAN, usually in an office or large building. What is the purpose of an access point?

[2 marks]

a. A communication satellite is a microwave repeater station in a space that is used for telecommunication, radio and television signals. Briefly describe how a Satellite Works

[3 marks]

b. Middleware is especially integral to modern information technology based on XML, SOAP, Web services, and service-oriented architecture. Define Middleware software **[2 marks]**

c. All network-based requests are essentially attempts to interact with back-end data. The requested data can take on many different forms and may be stored in a variety of ways, such as coming from a file server, fetched from a message queue or persisted in a database. Explain four reasons why middleware is used **[4 marks]**

d. What are network metrics? **[2 marks]**

e. Network performance refers to measures of service quality of a network as seen by the customer. What are some of the measures often considered important in measuring network performance? **[4 marks]**

f. Summarize the paradigm shift in computing in one paragraph. **[2 marks]**

QUESTION TWO (20 MARKS)

a. While both portable terminals and mobile terminals can move from one place to another, portable terminals are accessed only when they are stationary. WLANs aim to support truly mobile work stations. Describe five of the goals which have to be achieved while designing WLANs **[10 marks]**

b. Message Passing is done through a Communication Link. A link has some capacity that determines the number of messages that can reside in it temporarily and implementation of the link depends on the situation, it can be either a Direct

communication link or an In-directed communication link. Differentiate the two.

[4 marks]

c. Explain the following terms as applied in Networking: [6 marks]

    a. HTTP? TCP/IP, DHCP

QUESTION THREE (20 MARKS)

a. Traditionally, four types of characteristics are attributed to message flow: reliability, delay, jitter and bandwidth. Explain them [4 marks]

b. Quality of Service is described by parameters. Defining a QoS parameter indicates how to measure or determine its value, mentioning if necessary the events specified by the network service primitives. Describe any four main QoS parameters [8 marks]

c. The main purpose of end-to-end testing type is to test from the end user's experience by simulating the real user scenario and validating the system under test and its components for integration and data integrity. Describe end-to-end principle of networking and state two Benefits of E2E Testing [4 marks]

d. An end-to-end testing lifecycle consists of four components. State the 4 steps in the E2E Testing Lifecycle [4 marks]

QUESTION FOUR (20 MARKS)

a. The usage of Bluetooth has widely increased because of its special features. Explain any three of these features. [6 marks]

b. Differentiate between a thread and a process in wireless communication [2 marks]

c. The external interfaces of the radio access network (RAN) domain are standardized under 3GPP, as is the functional behavior of the RAN domain as a whole. What is a radio access network (RAN)? [2 marks]

d. RAN architecture is enhanced with the following nodes to achieve an optimal split:

    i.   Radio function (RF)

    ii.   Radio processing function (RPF)

    iii.   Packet processing function (PPF)

    iv.   Radio control function (RCF)

Briefly Explain each one of them [8 marks]

e. Typically, applications can use IPC, categorized as clients and servers, where the client requests data and the server responds to client requests. Define inter-process communication (IPC) [2 marks]

QUESTION FIVE (20 MARKS)

a. Quality of Service has issues like user mobility, mobility management, integration and interoperability of diverse networks, streaming multimedia based services, among others. This therefore calls for QoS Metrics. What does QoS metrics refer to?

[2 marks]

b. When looking at packet-switched networks, quality of service is affected by various factors, which can be divided into "human" and "technical" factors. Explain four Issues that affect the Quality of service in Multimedia Applications. **[4 marks]**

c. Does QoS slow down the internet? Explain. **[4 marks]**

d. In packet-switched networks, quality of service is affected by various factors, which can be divided into human and technical factors. Many things can happen to packets as they travel from origin to destination, resulting in the following problems as seen from the point of view of the sender and receiver:

    i.   Good put

    ii.   Packet loss

    iii. Errors

    iv. Latency

    v.   Packet delay variation

Describe each of the aforementioned problems **[10 marks]**