



(Knowledge for Development)

KIBABII UNIVERSITY

(KIBU)

**UNIVERSITY EXAMINATIONS
2020/2021 ACADEMIC YEAR**

**MAIN EXAMINATIONS
YEAR TWO SEMESTER ONE EXAMINATIONS**

**FOR THE DEGREE OF
BACHELORS OF SCIENCE
(INFORMATION TECHNOLOGY)**

COURSE CODE: BIT 214

COURSE TITLE: COMPUTER NETWORKS

DATE: 18/06/2021

TIME: 9.00 A.M. – 11.00 A.M.

INSTRUCTIONS TO CANDIDATES

ANSWER QUESTION ONE AND ANY OTHER TWO QUESTIONS

QUESTION ONE – [COMPULSORY] (30 MARKS)

- a. The ISO Reference Model defines seven protocol layers, each of which is responsible for a specific range of functions. By considering this model, explain the main functions performed by a protocol operating at:
- i. The Physical layer [2 marks]
 - ii. The Transport layer [2 marks]
 - iii. The Network layer [2 marks]
- b. Using proper illustrations, explain how data is transmitted along single mode and multi-mode fibre optic cable. [4 marks]
- c. While bus topology is considered one of the easiest to establish, it is a passive topology that is likely to suffer from a problem peculiar to the topology. Required:
- i. Identify the problem and explain how it is overcome [4 marks]
 - ii. Explain why the topology is referred to as passive. [2 marks]
- d. Using pinout diagrams, demonstrate how T-568A and T-568B standards are used in terminating straight through and crossover cables. [6 marks]
- e. The electromagnetic spectrum range (3KHz to 900THz) can be divided into 4 categories. Using a well labeled diagram explain the characteristics of the first three categories according to their frequency ranges. [8 marks]

QUESTION TWO (20 MARKS)

- a. The data link layer in the IEEE standard is divided into two sublayers: LLC and MAC. Indicate the functions performed by each sublayer. [5 marks]
- b. Explain the main difference between a circuit-switched network and a packet-switched network. Indicate which one would have higher latency and jitter and explain why. [6 marks]
- c. Using proper illustrations, compare and contrast the features of the three modes of network communication in terms of mode/direction of communication performance and provide examples of each. [9 marks]

QUESTION THREE (20 MARKS)

- a. Define protocol and explain the main elements of a protocol. [4 marks]
- b. Mr. S. Kalamba a technician with Linked Systems Technologies is setting up a LAN for a client. Identify four network devices that he would use in setting up the LAN. [4 marks]
- c. Explain the difference between the TWO packet data transfer techniques referred to as “connectionless” and “connection-orientated”. [4 marks]
- d. Paul Ssemalulu runs a retail shop in Bungoma town with the help of three stand-alone computers. He has had intentions of establishing a computer network but is still skeptical about the technology. Argue for and against this idea in order to help him make informed decision. [8 marks]

QUESTION FOUR (20 MARKS)

- a. Name two well-known data transport protocols provided by the Internet Transport Layer. Provide a brief description of each service and indicate what type of application might use that service. [4 marks]

b. Explain six advantages of IPv6 over IPv4.

[6 marks]

c. Explain in detail CSMA/CD Protocol and how it detects collision.

[10 marks]

QUESTION FIVE (20 MARKS)

a. Give an overview of the distance vector method of updating routing table information. In particular explain using an example how information about a node failure propagates using this algorithm.

[10 marks]

b. What problem is encountered in deciding whether a host has become unreachable.

[5 marks]

c. In what circumstances is it impossible to resolve this problem.

[5 marks]