



(Knowledge for Development)

KIBABII UNIVERSITY COLLEGE

A CONSTITUENT COLLEGE OF

MASINDE MULIRO UNIVERSITY OF

SCIENCE AND TECHNOLOGY

UNIVERSITY EXAMINATIONS

2014/2015 ACADEMIC YEAR

SECOND YEAR SECOND SEMESTER

MAIN EXAMINATION

FOR THE DEGREE OF BSC COMPUTER SCIENCE

COURSE CODE: CSC 223

COURSE TITLE: DATA COMMUNICATIONS

DATE: 7TH MAY, 2015

TIME: 8.00-10.00AM

Instructions to candidates:

- Answer **Questions ONE** and **ANY OTHER TWO**.

SECTION A

ANSWER ALL QUESTIONS FROM THIS SECTION (30MARKS)**1) Question One (30mks)**

- a) Data communication standards fall into two categories: de facto and de jure. Differentiate between these two categories.

(4mks)

- b) An Internet standard is a thoroughly tested specification that is useful to and adhered to by those who work with the Internet. It is a formalized regulation that must be followed. There is a strict procedure by which a specification attains Internet standard status.

Describe the purpose of the following bodies for standardization.

- i. ISOC (2mks)
- ii. IAB (2mks)
- iii. IETF (2mks)
- iv. IRTF (2mks)

- c) For communication to occur two or more entities, the entities must agree on a protocol. A protocol defines what is communicated, how it is communicated, and when it is communicated. Describe the three key elements of a protocol.

(6mks)

- d) Using a well labelled diagram, describe the following network topologies clearly identifying the advantages and disadvantages of each.

- i. Mesh Topology (4mks)
- ii. Bus Topology (4mks)
- iii. Ring Topology (4mks)

SECTION B**ANSWER ANY TWO QUESTIONS FROM THIS SECTION (40 MARKS)**

(All questions carry equal marks)

2) Question Two

- a) Define the following protocols as used in the internetworking models?

(4mks)

- i. SMTP
- ii. SNMP
- iii. DNS
- iv. LPD

- b) The TCP/IP (DOD model) model it is a condensed version of the OSI model composed of four layers. Using a suitable diagram explain the layers and how the TCP/IP stack maps on the OSI model. (8mks)
- c) Each layer of the DOD model has a couple of protocols associated to each. Discuss at least TWO protocols on each layer of the TCP/IP stack.
(8mks)

3) Question Three:

- a) Define Network Media?
(2mks)
- b) Network connectivity requires media to facilitate data transmission. Briefly describe any FOUR data transmission media you are familiar with.
(8mks)
- c) Modern technology has made it possible to achieve data communications without using any cables but using unguided media technology. Briefly explain any FOUR of the available wireless communication options available today.
(8mks)
- d) Wireless networks are much more susceptible to unauthorized use than cabled networks. Wireless network devices use radio waves to communicate with each other. What are some of the disadvantages of these wireless networks?
(4mks)

4) Question Four

- a) Differentiate between the following data communication terminologies
- i. Cellular telephony and Satellite networks
(2mks)
 - ii. Bit length and wavelength.
(2mks)
- b) Cellular telephony technology has undergone several advancements dubbed generations with a noble agenda of signal quality. Describe each of the following generations.
- i. 1G (2mks)
 - ii. 2G (2mks)
 - iii. 3G (2mks)
 - iv. 4G (2mks)

- c) A network is a set of connected devices. Whenever multiple devices are connected, there is a problem of how to connect them to make one-to-one communication possible. A better solution to this problem is switching. Discuss the following modes of switching:
- i. Circuit switching
(4mks)
 - ii. Packet switching
(4mks)

5) Question Five

- a) Define following terminologies as used in data communication
- i. Channelization
(2mks)
 - ii. Multiplexing
(2mks)
- b) Signals travel through transmission media, which are not perfect. The imperfection causes signal impairment. This means that the signal at the beginning of the medium is not the same as the signal at the end of the medium. What is sent is not what is received. Discuss three causes of signal impairment. (7mks)
- c) Discuss the three channelization protocols clearly identifying the application areas (if possible) for each of the protocol.
(9mks)