



*(Knowledge for Development)*

**KIBABII UNIVERSITY**

**(KIBU)**

**UNIVERSITY EXAMINATIONS  
2017/2018 ACADEMIC YEAR  
END OF SEMESTER EXAMINATIONS  
YEAR ONE SEMESTER TWO EXAMINATIONS**

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

**COURSE CODE: BIT 125**

**COURSE TITLE: DATA COMMUNICATION**

**DATE: 7/8/2018**

**TIME: 9.00 A.M-11.00 A.M**

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**INSTRUCTIONS TO CANDIDATES**

**ANSWER QUESTION ONE AND ANY OTHER TWO QUESTIONS**

### Question One (30 Marks) [Compulsory]

- a. Define the following terms. [3 Marks]
- Data communication
  - Network
  - framing
- b. Using a well labelled diagram, describe the components of a data communication system. [10 Marks]
- c. Explain why protocols are needed in data communication. [2 Marks]
- d. i. Explain the relationship between period and frequency. [2 Marks]  
ii. The period of a signal is 100 ms. Determine its frequency in kilohertz. [3 Marks]
- e. Translation, encryption, and compression are some of the duties of the presentation layer in the OSI model. Which layer is responsible for these duties in the Internet model? Explain your answer. [3 Marks]
- f. Define carrier signal and explain its role in analog transmission. [3 Marks]
- g. Compare and contrast a circuit-switched network and a packet-switched network. [4 Marks]

### Question Two (20 Marks)

- a. Distinguish between baseband transmission and broadband transmission. [2 Marks]
- b. Discuss three types of transmission impairment. [9 Marks]
- c. i. Compare and contrast byte-oriented and bit-oriented protocols. [4 Marks]  
ii. Supporting your answer by valid reason explain which category of the above protocols has been popular in the past and which one is now popular. [5 Marks]

### Question Three (20 Marks)

- a. Explain the difference between guided media differ from unguided media. [2 Marks]
- b. Explain any four advantages of optical fiber over twisted-pair and coaxial cable. [8 Marks]
- c. Explain why collision is an issue in a random access protocol but not in controlled access or channelizing protocols. [2 Marks]
- d. Discuss any two protocols for noiseless channels and any two protocols for noisy channels [8 Marks]

### Question Four (20 Marks)

- a. Explain the difference between half-duplex and full-duplex transmission modes and state an advantage of each [4 Marks]
- b. Describe the three criteria necessary for an effective and efficient network [6 Marks]
- c. Explain the difference between network layer delivery and transport layer delivery. [2 Marks]
- d. Describe the services provided by the application layer in the Internet model. [8 Marks]

### Question Five (20 Marks)

- a. Explain the purpose of block coding. [2 Marks]
- b. Using a well labelled diagram, explain the difference between digital and analog signal. [6 Marks]
- c. Define a DC component and describe its effect on digital transmission. [3 Marks]
- d. Given the frequencies listed below, calculate the corresponding periods. [9 Marks]
- 24Hz
  - 8 MHz  $\times 10^{-6}$
  - 140 KHz  $\times 10^{-3}$

Reliability  
Performance  
Timing