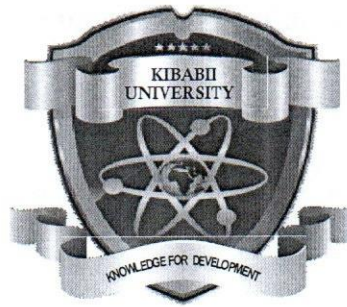


15 20



*(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: 17/10/2018**

**TIME: 11.30 AM – 1.30 PM**

---

**SUP/SPECIAL PAPER**

**INSTRUCTIONS TO CANDIDATES**

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

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

- a. Define the following terms. [2 Marks]
  - i. Internet
  - ii. Protocol
- b. Identify three transmission modes and state an advantage of each [6 Marks]
- c. If a periodic signal is decomposed into five sine waves with frequencies of 100, 300, 500, 700, and 900 Hz, what is its bandwidth? [3 Marks]
- d. Compare and contrast the telephone network and the Internet. [4 Marks]
- e. Explain two advantages and two disadvantages of combining the session, presentation, and application layer in the OSI model into one single application layer in the Internet model. [8 Marks]
- f. Differentiate between parallel and serial transmission. [2 Marks]
- g. Define constellation diagram and explain its role in analog transmission. [3 Marks]
- h. Distinguish between forward error correction versus error correction by retransmission. [2 Marks]

**Question Two (20 Marks)**

- a. Describe five line coding schemes. [10 Marks]
- b. Discuss the concept of redundancy in error detection and correction. [2 Marks]
- c. Identify the characteristics of an analog signal that are changed to represent the digital signal in each of the following digital-to-analog conversion. [8 Marks]
  - i. ASK
  - ii. FSK
  - iii. PSK
  - iv. QAM

**Question Three (20 Marks)**

- a. Identify four major components of a packet switch and describe their functions. [12 Marks]
- b. Describe any four line coding schemes. [8 Marks]

**Question Four (20 Marks)**

- a. Differentiate between random access and controlled access. [2 Marks]
- b. Describe three main multiplexing techniques. [6 Marks]
- c. Describe three protocols in random access category and three protocols in controlled access category. [12 Marks]

**Question Five (20 Marks)**

- a. Distinguish between data rate and signal rate. [2 Marks]
- b. Identify the five components of a data communications system [5 Marks]
- c. Describe three techniques of digital-to-digital conversion. [6 Marks]
- d. A signal can be decomposed into five sine waves with frequencies at 0, 20, 50, 100, and 200 Hz. All peak amplitudes are the same. Determine and draw its bandwidth. [7 Marks]