



**JARAMOGI OGINGA ODINGA UNIVERSITY OF SCIENCE AND TECHNOLOGY**

**UNIVERSITY EXAMINATION 2019**

**FOR THE DEGREE OF BACHELOR OF SCIENCE IN COMPUTER SECURITY AND  
FORENSICS, INFORMATION AND COMMUNICATION TECHNOLOGY AND  
BUSINESS INFORMATION SYSTEMS**

**1<sup>ST</sup> YEAR 2ND SEMESTER EXAMINATION 2020/2021 ACADEMIC YEAR**

**MAIN**

**COURSE CODE: IIT 3121**

**COURSE TITLE: DATA COMMUNICATION PRINCIPLES**

**EXAM VENUE:**

**STREAM:**

**DATE:**

**EXAM SESSION:**

**TIME: 2 HOURS**

**INSTRUCTIONS**

1. This paper contains FIVE (5) questions
2. Answer question 1 (Compulsory) and ANY other 2 questions
3. Write answers in the booklet

## **QUESTION 1**

- a) Define
- i) Jitter [2 Marks]
- ii) Bandwidth [2 Marks]
- b) Explain the importance of standards in data communication [4 Marks]
- c) Distinguish between narrowband and wideband channel [2 marks]
- d) Identify **three** impairments that occur during data transmission [6 Marks]
- e) The power we use at home has a frequency of 80 Hz. Determine the period of this sine wave [2 Marks]
- f) If a periodic signal is decomposed into five sine waves with frequencies of 200, 400, 600, 800, and 1000 Hz, what is its bandwidth? Draw the spectrum, assuming all components have maximum amplitude of 10V [5 Marks]
- g) A very important consideration in data communications is how fast we can send data, in bits per second, over a channel. Data rate depends on three factors. Name them [3 Marks]
- h) Differentiate between point-to-point and multipoint connections [2 Marks]
- i) Explain stop and wait protocol [2 Marks]

## **QUESTION 2**

- a) Discuss the **five** components of data communication system [10 Marks]
- b) Explain stop-and-wait protocol [2 Marks]
- c) Differentiate between baseband and broadband [2 Marks]
- d) What is network topology [2 Marks]
- e) Write brief notes on
- i) Circuit switching [2 Marks]
- ii) Packet Switching [2 Marks]

### **QUESTION 3**

- a) Explain the different types of computer networks [6 Marks]
- b) In order to convert sound to digital form, the following processes are carried out: sampling, quantization and encoding. Explain these processes [6 Marks]
- c) Write short notes on noisy channel: Shannon capacity [4 Marks]
- d) Explain **four** characteristics of a digital signal [4 Marks]

### **QUESTION 4**

- a) A network with bandwidth 20mbps can pass only an average of 24,000 frames per minute with each frame carrying an average of 20,000 bits. What is the throughput of this network [4 Marks]
- b) List **five** layers and their functionality in TCP/IP model [10 Marks]
- c) Compare and contrast coaxial cable with optical fiber [6 Marks]

### **QUESTION 5**

- a) Explain
- i) Amplitude Shift Keying (ASK) [1 Mark]
- i) Frequency Shift Keying (FSK) [1 Mark]
- i) Phase Shift Keying (PSK) [1 Mark]
- b) Explain Frequency Division Multiplexing (FDM) and demultiplexing process [4 Marks]
- c) Discuss **four** types of noises in data transmission medium [8 Marks]
- d) Explain parity check [2 Marks]
- e) Define a frame as used in data communication [1 Mark]
- f) List **two** data link layer protocols [2 Marks]