

**NATIONAL OPEN UNIVERSITY OF NIGERIA**

**University Village, 91 Cadastral Zone, NnamdiAzikwe Expressway, Jabi, Abuja**

**FACULTY OF SCIENCES**

**April, 2019 Examinations**

**COURSE CODE: CIT303**

**COURSE TITLE: Principles of Communication Technology**

**CREDIT: 3 Units**

**TIME ALLOWED: 2½ Hours**

**INSTRUCTION: Answer Question 1 and any other FOUR (4) Questions**

**Question 1**

a. Discuss the characteristics of optical fibre cable as a transmission medium **(3 marks)**

b. Give the advantages and disadvantages of terrestrial microwave as a transmission medium in terms of cost, ease of installation and adaptability in providing a range of services to clients

 **(5 marks)**

c. List in correct order the layer of the Open System Interconnect (OSI) model **(3½ marks)**

d. State the function of each OSI layer listed in (1c) above.(3½  **marks)**

e. Differentiate between the terms communication and telecommunication. (**3 marks)**

f. State the four fundamental characteristics upon which the effectiveness of a data communication depends**. (4 marks)**

**(22 marks)**

**Question 2**

1. Give a list of possible data representation in data communication. **(3 marks)**
2. Briefly describe each of the data representation identified in (2a) above and the form of their preparation for transmission. **(6 marks)**
3. List the basic elements/components of Data Communications. **(3 Marks)**

**(12 marks)**

**Question 3**

a. Identify four main applications of Digital Signal Processing (DSP) **(2 marks)**

b. Give four specific examples of DSP applications **(2 marks)**

c. Explain the way DSP is carried out **(4 marks)**

d. Discuss Signal sampling **(4 marks)**

**(12 marks)**

**Question 4**

a.Briefly explain the following terms:**(4 x 2marks)**

1. Filter
2. Bandwidth
3. Impulse
4. Fourier transform

b. What do you understand by *Signal-to-Noise Ratio* (SNR) (**2 marks)**

c. What are the values of SNR and SNRdB if the power of a signal is 10 mW and the power of the noise is µW? **(2 marks)**

**(12 marks)**

**Question 5**

a. Write short notes with examples on:

Analog signal processing **(3 marks)**

Digital signal processing **(3 marks)**

b. Describe three characteristics of microwave propagation **(3 Marks)**

c. The loss in a cable is usually defined in decibels per kilometer (dB/km). If the signal at the beginning of a cable with -0.3 dB/km has a power of 2 mW, what is the power of the signal at 5 km? **(3 marks)**

**(12 marks)**

**Question 6**

a. Outline four services provided by Network security (2 marks)

b. Explain what is meant by cryptography (3 marks)

c. State the three types of keys in Cryptography and their uses (3 marks)

d. Differentiate between Symmetric-Key and Asymmetric-Key Cryptography. (4 marks)

**(12 marks)**