UNIVERSITY OF EMBU

2016/2017 ACADEMIC YEAR

SECOND SEMESTER EXAMINATION

FIRST YEAR EXAMINATION FOR THE DEGREE OF BACHELOR OF COMPUTER SCIENCE

CSC 123: DATA COMMUNICATION

DATE: APRIL 10, 2017 **TIME: 2:00-4:00PM**

INSTRUCTIONS:

Answer Question ONE and ANY Other TWO Questions.

QUESTION ONE

a) Define the following terms as they apply in the field of data communication (5 Marks)

i. Data Communication

ii. Port Numbers

iii. Throughput

iv. Data Rate

v. Wavelength

b) Using examples differentiate Manchester and differential Manchester encoding techniques (5 Marks)

c) Explain the process of detecting errors using cyclic redundancy check (5 Marks)

d) List and explain **two** well-known data transport layer protocols in the TCP/IP protocol suite (5 Marks)

e) Communication protocol architectures apply divide-and-conquer principle. Discuss the importance of this principle and how it is achieved (5 Marks)

f) Transmission media for data communication could be guided or unguided. Differentiate the **two** types of transmission media giving **two** examples for each medium. (5 Marks)

QUESTION TWO

a) In considering the design of data transmission systems, key concerns are data rate and distance. A number of design factors relating to the transmission medium and the signal determine the data rate and distance. Describe these **four** factors (10 Marks)

b) In your own words, describe the role played by each of the layer of the TCP/IP protocol suite (10 Marks)

QUESTION THREE

a) Explain the term noise as used in data communication (2 Marks)

b) Discuss the **four** types of noise an electromagnetic signal is likely to suffer from (8 Marks)

c) Both long-haul telecommunications facilities and intra-building services are quickly moving to digital transmission and where possible to digital signaling. Explain in your own words, **five** reasons for this trend. (10 Marks)

QUESTION FOUR

a) In your own words, describe how an antenna works (4 Marks)

b) Explain any **three** applications that run on top of TCP (6 Marks)

c) Discuss any **five** reasons why optical fibers are being preferred over twisted pair and coaxial cables (10 Marks)

QUESTION FIVE

a) Discuss the following forms of multiplexing as they apply in the field of data communication (5 marks)

   i. Synchronous time division multiplexing
   ii. Statistical time division multiplexing

b) Discuss the following switching techniques (5 Marks)

   i. Packet switching
   ii. Circuit switching

c) Using a well-labeled diagram show the components of a simplified communications model and explain the role played by each component. (10 Marks)

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