ELIZADE UNIVERSITY, ILARA-MOKIN, ONDO STATE
FACULTY OF ENGINEERING
DEPARTMENT OF ELECTRICAL AND COMPUTER ENGINEERING

FIRST SEMESTER EXAMINATION, 2016/2017 ACADEMIC SESSION

COURSE TITLE: DATA COMMUNICATIONS AND COMPUTER NETWORKS

COURSE CODE: ECE409/ECT415

EXAMINATION DATE: 30th MARCH 2017

COURSE LECTURER: PROF. A. I. OLUWARANTI

HOD's SIGNATURE

TIME ALLOWED: 2 HOURS

INSTRUCTIONS:

1. ANSWER FOUR QUESTIONS ONLY
2. SEVERE PENALTIES APPLY FOR MISCONDUCT, CHEATING, POSSESSION OF UNAUTHORIZED MATERIALS DURING EXAM.
3. YOU ARE **NOT** ALLOWED TO BORROW ANY WRITING MATERIALS DURING THE EXAMINATION.

Question #1

a. List the different types of Addresses in TCP/IP Architecture. [2 marks]

b. Fully discuss with illustration the responsibilities of the Transport layer in TCP/IP Architecture. [8 marks]

c. IPv6 was conceived to remedy some limitations of IPv4, list and discuss four (4) of these shortcomings. [8 marks]

d. What is Unicode and give the maximum number of characters or symbols that can be represented by Unicode? [2 marks]

Question #2

a. With the aid of a well annotated diagram, explain the components of a typical telecommunication model. [6 marks]

b. Write short notes on the following: [3 marks each]
   i. Peer-to-Peer Architecture
   ii. Protocol Flow Control
   iii. Client/Server Architecture

c. Discuss the Protocol Message Format according to IEEE 802.3 standard specification for an Ethernet Packet. [5 marks]

Question #3

a. Compare and contrast protocol and interface; using appropriate diagram and examples. [6 marks]

b. Discuss the functions of Network Protocols. [4 marks]

c. Discuss the ISO-OSI Reference Model with the aid of a diagram. [6 marks]

d. Differentiate between Physical Addresses and Logical Addresses. [4 marks]

Question #4

Elizade University requested from her uplink provider for a /25 block of IPv4 Internet address, but the ISP supplied a /26 IP address. Given the IP address 224.246.158.140/26, determine the following. [2 marks each]

(i) Netmask Address, (ii) Broadcast Address, (iii) First Host Address, (iv) Netmask Bits,
(v) Network Address, (vi) IP Address in Bits, (vii) Address Class (viii) Last Host Address,
(ix) Network Address in Hexadecimal, (x) Total number of Actual Host in the Network Segment

Question #5

a. Briefly discuss major milestones in the evolution of Internet. [6 marks]

b. Highlight the differences between Switch and Router. [4 marks]

c. Expatiate on the factors to be considered in choosing a network topology. [5 marks]

d. Justify the laying of Fiber Cable all over Nigeria by the Telecommunication Companies. [5 marks]

Question #6

a. A signal with 200 milliwatts power passes through 10 devices, each with an average noise of 2 microwatts. What is the SNR? What is the SNR_{db}? [6 marks]

b. If the peak voltage value of a signal is 20 times the peak voltage value of the noise, what is the SNR? What is the SNR_{db}? [8 marks]

c. We have a channel with 4kHz bandwidth. If we want to send data at 100Kbps, what is the minimum SNR_{db}? What is SNR? [6 marks]