

MOSHOD ABIOLA POLYTECHNIC, ABEOKUTA
DEPARTMENT OF COMPUTER SCIENCE
2023/2024 1ST SEMESTER EXAMINATIONS

Course Code: COM 414
Course Title: DATA COMMUNICATION AND NETWORK
No. of Units: 3 UNITS **Time Allowed:** 3hrs
Class(es) writing the Paper: HND II COMPUTER SCIENCE (F/T & EVENNING)

Instructions- Attempt any **FOUR** questions from Section A and **ONE** question from Section B.

SECTION A (THEORY)

QUESTION ONE

- a. A company that manufactures custom-made bicycles has asked you to install an economical computer network that will be up-to-date in communication technology and be flexible enough to allow for future expansion.
- i. Write five benefits of installing the computer network for the organization (10 Marks)
- b. Explain briefly the following:
- i. Metropolitan Area Network (MAN) (3 Marks)
- ii. Wide Area Network (WAN) (3 Marks)
- c. Write two advantages and two disadvantages of Mesh topology (4 Marks)

QUESTION TWO

- a. Explain the following key elements of a protocol:
- i. Syntax ii. Semantics iii. Timing (12 Marks)
- b. i. Distinguish between **De facto** and **De jure** (4 Marks)
- c. Write short note on the following network components used to configure a computer network: (i) Repeater (ii) Hubs (iii) Gateway (6 marks)

QUESTION THREE

- a. Describe briefly three types of the sources of noise. (6 Marks)
- b. State two major effects of noise on the transmitted message during communication. (4 Marks)
- c. Discuss five components of a Data Communication model. (10 Marks)

QUESTION FOUR

- a. List and describe briefly the components of a typical frame used to transmit a character data (8 Marks)
- b. i) Explain Synchronous communication. (5 Marks)
- ii) Write two merits and three drawbacks of Synchronous communication. (5 Marks)
- c. Define the term "Jitter" as related to data communication. i. (2 Marks)

- 1b. List and explain five characteristics of twisted pair cable as a data communication transmission medium (5 Marks)

Question 2

- (i) With aid of diagram explain the concept of Data Communication Equipment (DCE) in Data communication and Network environment (5 Marks)
- (ii) Explain Basic Data Communication Concept (2 marks)
- (iii) State and apply mandate for the leading bits section of the Network address to determine Network Address Range for Classes A, B and C. (3 marks)
- (v) The following table shows the first three subnets, Valid host, and broadcast address in a class B 255.255.255.240.0 mask.

Subnet	16.0	32.0	48.0
First Host	16.1	32.1	48.1
Last Host	31.254	47.254	63.254
Broadcast	31.255	47.255	63.255

Use the Information from the table above to answer the following

- (i) How many subnets? 2 Marks
- (ii) How many hosts per subnet? 2 Marks
- (iii) What are the valid subnets? 2 Marks
- (iv) What are the valid hosts? 2Marks (indicate from 4th to 6th valid subnets)
- (v) What is the broadcast address for each subnet? 2 Marks

QUESTION FIVE

All the layers of Open Systems Interconnection (OSI) work collaboratively to transmit data from one device to another across the globe.

a. Write short note on each layer to describe the specific functions that they performed.

b. Hence, draw a well-labelled diagram of OSI

(20 marks)

SECTION B (ATTEMPT ONLY ONE QUESTION)

Question 1a

- (i) Your department secretary calls your attention to an urgent memo from the Management, requesting your department to prepare Window 2012 server for demonstration at the next management meeting. This was necessitated by HOD request for new server machine and window server 2012 (OS) for the Department. (List steps involved) (5 Marks)
- (ii) What is the main objective of License agreement introduced by Microsoft in 2012 server Operating System installation? (1 Marks)
- (iii) After formatting the Hard disk during window server 2012 installation, the system perform five critical action on the disk to finalize the process. List these action? (5 Marks)
- (iv) Before you can install Roles and Features on server machine system you will be expected to ensure that certain conditions are met. Mention those conditions. (4 Marks)