



**NATIONAL OPEN UNIVERSITY OF NIGERIA**  
**University Village, 91 Cadastral Zone, NnamdiAzikwe Expressway, Jabi, Abuja**  
**FACULTY OF SCIENCES**  
**COMPUTER SCIENCE DEPARTMENT**  
**2022\_2 EXAMINATIONS**

**Course Code:** CIT852

**Course Title:** Data Communication and Networks

**Course Credit Unit:** 3

**Time:** 2½ hrs

**Instruction:** Answer question 1 and any other three (3) questions.

- 1a) Compare Client/Server and Peer-to-Peer architecture (6 marks)
- b) List the important aspects to be considered while designing a network. (2 marks)
- c) In the context of data communication, what do you understand by the term ‘Switching’? (1 mark)
- d) Describe the switching techniques commonly employed in data communication. Which one is suitable for voice transmission? (5½ marks)
- e) List the different framing methods (2 marks)
- f) In the context of digital-to-digital modulation, which type of encoding is most effective at removing the DC component in the signal and why? (3 marks)
- g) Give five of the important features that distinguish one network from another. (2½ marks)
- h) What is instant messaging? State two of its vulnerabilities. (3 marks)
- 2a) How is BGP different from other distance vector routing protocols? (2 marks)
- b) State the advantage(s) of bit stuffing over character stuffing. (1 mark)
- c) Briefly explain Reverse path forwarding. (3 marks)
- d) Differentiate between bit rate and baud rate? (2 marks)
- e) Outline three advantages and four disadvantages of Asynchronous communication. (7 marks)
- 3a) What are the limitations of using the following;
- i) TCP/IP model (2 marks)
- ii) Radio transmitter (2 marks)
- b) (i) What is a multiplexer? (3 marks)
- ii) Differentiate between upward multiplexing and downward multiplexing. (2 marks)
- c) List the core protocols of the Internet layer of the OSI reference model stating the responsibility of each. (6 marks)
- 4a) List the sub-layers of the Data Link layer and state the key functions of each sub layer? (3 marks)
- b) Within the context of any application-to-application communication, there are some specific security requirements
- i) List the requirements (2 marks)
- ii) State the types of cryptographic schemes typically used to accomplish the requirements/goals listed in (i) above. (1½ marks)
- c) Give the different approaches to open loop control (1½ marks)
- d) Write short notes on Block ciphers. Illustrate your answer with diagram where necessary. (7 marks)

- 5a) In the context of internetworking, discuss fragmentation. (5 marks)
- b) In a tabular form, identify the types of routers OSPF identifies and the purpose of each (4 marks)
- c) Using the following criteria, compare Virtual Circuit and Datagram Subnets (6 marks)
- i) Addressing machine
  - ii) Referencing of circuit setup
  - iii) State information by a router
  - iv) Routing procedure
  - v) Effect of router failures
  - vi) Congestion control mechanism
- 6a) Extensively discuss the following :
- i) Unipolar Encoding (7 marks)
  - ii) Bipolar Encoding (5 marks)
- (Use diagram for better illustration where necessary)
- b) State any three disadvantages of Synchronous Communication. (3 marks)