



**NATIONAL OPEN UNIVERSITY OF NIGERIA  
14-16 AHMADU BELLO WAY, VICTORIA ISLAND LAGOS  
MARCH/APRIL 2016 EXAMINATION**

**SCHOOL OF SCIENCE AND TECHNOLOGY**

***COURSE CODE:*** CIT852  
***COURSE TITLE:*** Data Communication and Networks

***Time:*** 3 hrs

***Course Credit Unit:*** 3

***Instruction: Attempt any five (5) questions.***

1.
  - a. List the 4 types of routers identified by OSPF and state the function of each router (4 marks).
  - b. When an application invokes TCP, state and explain briefly what services it receives from TCP (6 marks).
  - c. State 3 important features of UDP (3 marks)
  - d. State 2 applications that use UDP exclusively (1 mark).
  
2.
  - a. State the 3 steps required for connection establishment in connection oriented services (3 marks).
  - b. Briefly explain the following concepts:
    - i. Flooding (3.5 marks)
    - ii. Link state routing (4.5 marks)
  - c. State 3 reasons for congestion on a network (3 marks)
  
3.
  - a. Explain the following terms:
    - i. Hierarchical address (1 mark)
    - ii. Flat address (1 mark)

- iii. Static Address assignment (1.5 marks)
- iv. Dynamic address assignment (1.5 marks)
- v. Adaptive routing (1.5 marks)
- vi. Non-adaptive routing (1.5 marks)
- b. When routers receive packets faster than they can forward them, state the 2 possibilities that could occur in the case of congestion. (2 marks)
- c. State 4 features of a token bucket traffic shaper. (4 marks)

4.

- a. Complete the following table (3.5 marks):

Layer	Data Package Name
Application	
Presentation	
Session	
Transport	
Network	
Data-link	
Physical	

- b. With the aid of a table ONLY, outline 5 differences between the OSI reference model and the TCP/IP model. (5 marks)
- c. Define the following terms: (1 mark each)
  - i. Baud
  - ii. Noise
  - iii. Propagation delay
  - iv. Attenuation
- d. For a constant rate transmission, if it takes 100 seconds to complete 1 transmission cycle, what is the frequency of the transmission? (1.5 marks)

5.

- a. List the steps of the Dijkstra routing algorithm (5 marks)
- b. Using a table only, highlight 2 differences between congestion control and flow control. (4 marks)
- c. For each class of IP address, specify the following with the aid of a table containing the following columns: (5 marks)
  - i. IP address class
  - ii. Higher order bit
  - iii. Format

6.

- a. Briefly explain the key features of the following:
    - i. Circuit-switched networks (2.5 marks)
    - ii. Packaged-switched networks (2.5 marks)
  - b. State 3 advantages and 2 disadvantages of each of the following network topologies: (2 marks each)
    - i. Bus
    - ii. Star
    - iii. Ring
  - c. List 3 types of broadcast networks (1 marks each)
- 7.
- a. State 3 drawbacks each of the TCP/IP reference model and the OSI reference model.  
(6 marks)
  - b. State 2 approaches to broadcast infrared networking. (2 marks)
  - c. State 3 characteristics of a connection-oriented service (3 marks)
  - d. List and explain very briefly 3 strategies to manage congestion in a network (3 marks)