NATIONAL OPEN UNIVERSITY OF NIGERIA,
PLOT 91 CADASTRAL ZONE, NNAMDI AZIKIWE EXPRESSWAY, JABI – ABUJA
FACULTY OF SCIENCES

Course Code: CIT852 *Time:* 3 hrs
Course Title: Data Communication and Networks
***Course Credit Unit*:** 3
Instruction: Attempt question one (22 marks) and any other four (4) questions (12 marks each)
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a. Complete the following table (7 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:
   i. Baud (2 mark)
   ii. Noise (2 mark)
   iii. Propagation delay (2 mark)
   iv. Attenuation (2 mark)

d. For a constant rate transmission, if it takes 100 seconds to complete 1 transmission cycle, what is the frequency of the transmission?(2 marks)

2.

a. Briefly explain the key features of the following:
   i. Circuit-switched networks (2 marks)
   ii. Packaged-switched networks (2 marks)

b. State 3 advantages and 2 disadvantages of each of the following network topologies:
   i. Bus (1.5 marks)
   ii. Star (1.5 marks)
   iii. Ring (2 marks)

c. List 3 types of broadcast networks (1 mark each)

3.

a. State 3 drawbacks each of the TCP/IP reference model and the OSI reference model. (4.5 marks)
b. State 2 approaches to broadcast infrared networking.(1.5 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)

4.

a. State the 3 steps required for connection establishment in connection oriented services (3 marks).
b. Briefly explain the following concepts:
    i. Flooding (3 marks)
    ii. Link state routing (3 marks)
c. State 3 reasons for congestion on a network (3 marks)

5.

a. List the steps of the Djikstra routing algorithm (3 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. 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 (4 marks).
c. State 3 important features of UDP (3 marks)
d. State 2 applications that use UDP exclusively (1 mark).

7.

a. Explain the following terms:
    i. Hierarchical address (1 mark)
    ii. Flat address (1 mark)
    iii. Static Address assignment (1 marks)
    iv. Dynamic address assignment (1 marks)
    v. Adaptive routing (1 marks)
    vi. Non-adaptive routing (1 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)