**NATIONAL OPEN UNIVERSITY OF NIGERIA**
14/16, Ahmadu Bello Way, Victoria Island

**SCHOOL OF SCIENCE AND TECHNOLOGY**
**October, 2013 Examination**

**Course Code: CIT852** **Time Allowed: 3 hours**

**Course Title: Data Communication and Networks**

**Instruction: Attempt any Five (5) questions**

**Question 1**
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)

**a)** When routers receive packets faster than they can forward them, state the 2 possibilities that could occur in the case of congestion. (2 marks)
**b)** State 4 features of a token bucket traffic shaper. (4 marks)

**Question 2**
a) Define the following?
i) Topology
ii) Protocol
iii) Computer Network Architecture
b) Enumerate the advantages and disadvantages of the Ring Topology

**Question 3**

a) Write briefly on all the layers of the OSI reference Model
b) Contrast between OSI reference Model and TCP/IP Reference Model
c) What is cryptography?

**Question 4**
a) What is Data Transmission?

b) Contrast between the following;
   i) Parallel and Serial Communication.
   ii) Asynchronous, Synchronous and Isochronous Communication.
   iii) Simplex, Half duplex and Full duplex Communication.

**Question 5**

a) Briefly explain the key features of the following:
   i. Circuit-switched networks (2.5 marks)
   ii. Packaged-switched networks (2.5 marks)

   a. State 3 advantages and 2 disadvantages of each of the following network topologies:
      iii. Bus (2.5 marks)
      iv. Star (2.5 marks)
      v. Ring (2.5 marks)
   b. List 3 types of broadcast networks (1.5 marks)

**Question 6**

a) What is a Network loop? (8 marks)

b) Some networks contain more than one bridge, which increases the likelihood of networking loops.
   What is the solution to networking loops?
   (9 marks)

**Question 7**

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:
   i. Baud (1 mark)
   ii. Noise (1 mark)
   iii. Propagation delay (1 mark)
   iv. Attenuation (1 mark)
d. For a constant rate transmission, if it takes 100 seconds to complete 1 transmission cycle, what is the frequency of the transmission?