UNIVERSITY COLLEGE TATI

UNIVERSITY COLLEGE TATI (UCTATI)

FINAL EXAMINATION QUESTION BOOKLET	
COURSE CODE	: BNS 3143
COURSE	: NETWORK ANALYSIS & DESIGN
SEMESTER/SESSION	: 2 - 2022/2023
DURATION	: 3 HOURS

Instructions:

1. This booklet contains 5 questions. Answer ALL questions.
2. All answers should be written in answer booklet.
3. Write legibly and draw sketches wherever required.
4. If in doubt, rise up your hands and ask the invigilator.

DO NOT OPEN THIS BOOKLET UNTIL YOU ARE TOLD TO DO SO

THIS BOOKLET CONTAINS 4 PRINTED PAGE INCLUDING COVER PAGE

QUESTION 1

a. What are the **FOUR (4)** main phases of network design per the top-down network design approach? List and describe. [8 marks]

b. There are two common methods used to test a network design: Pilot network and Prototype network. Give justification why you testing the design with a prototype network. [6 marks]

c. Why is it important to document your network design as a proposal? What typically items or topics in a proposal? Briefly explain. [6 marks]

QUESTION 2

a. In your own words, describe each of the following goals of network design:

i) Availability [2 marks]

ii) Manageability [2 marks]

iii) Scalability [2 marks]

iv) Security [2 marks]

b. List the **SIX (6)** phases in the PDIOO network life cycles. [6 marks]

c. Understanding your customer's business goals is a critical aspect of network design. Classify **FOUR (4)** typical business goals in network design. [4 marks]

d. It is important to analyze any business constraints that will affect your network design. Find **TWO (2)** categories of business constraints. [2 marks]

QUESTION 3

There are two types of routing protocols; static and dynamic. Dynamic Routing protocols are classified into two major categories: distance vector protocols and link-state protocols. Routing Information Protocol (RIP) and Open Shortest Path First (OSPF) are among the most popular Dynamic Routing protocols in TCP/IP suite.

a. When is it appropriate to use IP private addressing versus public addressing? [2 marks]

b. What are **THREE (3)** approaches to upgrading IPv4 to IPv6? List and describe. [6 marks]

c. What factors will help you decide whether distance-vector or link-state routing is best for your design customer? [4 marks]

d. Explain in detail using a diagram the Internet Protocol Suite (TCP/IP) model and it's respective applications. [8 marks]

QUESTION 4

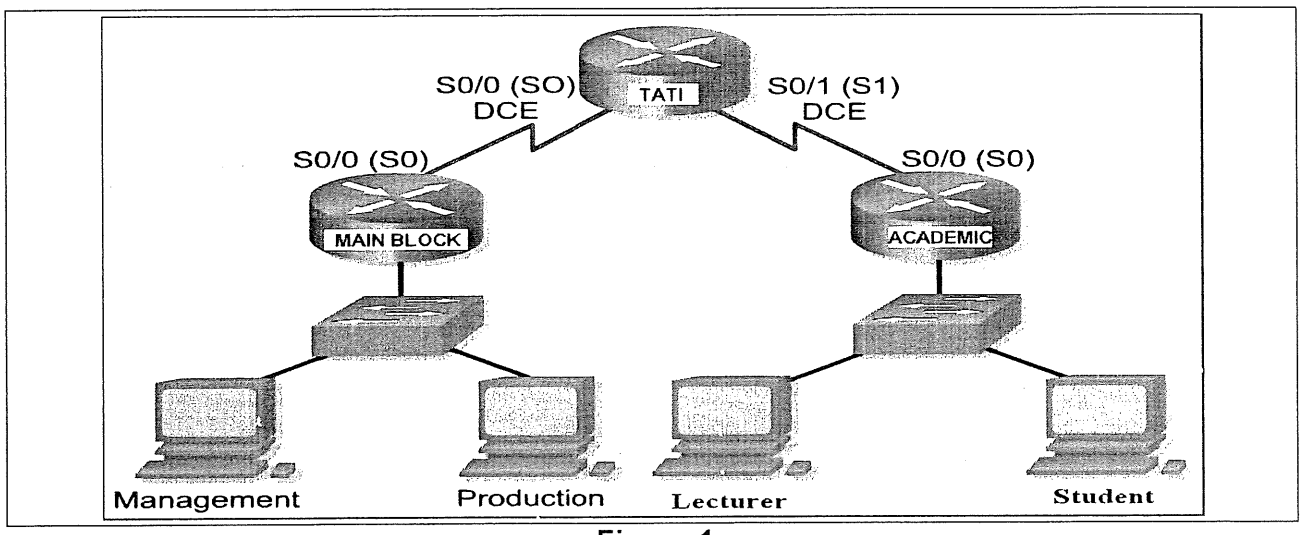

Figure 1

The current diagram in Figure 1 shows a local network that has been assigned a network address of **192.168.1.0.** The scenario is that **TATI** is main campus of an academic institution. **MAIN BLOCK** and **ACADEMIC** are branch campuses. Each subnet of the **MAIN BLOCK** network needs to accommodate **14 host** addresses. While the **ACADEMIC** network will provide **30 host** addresses for each subnet. **Do not use** subnet zero as the first subnet.

a) Sketch a new network diagram that can accommodate all requirements above. Make sure all subnets have correct label and specific subnet addresses. [8 marks]

b) Complete all information in the **Table 1** below with **6 usable subnets** of the LAN addresses. [12 marks]

Table 1

Subnet	Subnet Address	Subnet Mask (/x)	First Host	Last Host	Broadcast
0			Do not use	subnet 0	
1					
2					
3					
4					
5					
6					
7					

QUESTION 5

A **4-floor** new building is being constructed on **TESLA** factory, named as **BLOCK X**. It is estimated that **each floor** may have **60** to **200 stations**.

The Network Administrator of TESLA also assigns **4 usable subnets** for this **BLOCK X**, and each floor has its own subnet. TESLA will be using the Class B address **172.19.0.0/16**. **Ground floor** subnet needs to accommodate **200** host addresses, **first floor and second floor** subnet needs to accommodate **100** host addresses, and third floor subnet needs to accommodate **60** host addresses.

Use variable-length subnet mask (VLSM) to support more efficient use of the assigned IP addresses and to reduce the amount of routing information at the top level. Show your work in **answer booklet** to justify your VLSM subnet calculation. [20 marks]

---------- **END OF QUESTIONS** ----------