



UNIVERSITY EXAMINATIONS

**THIRD YEAR EXAMINATION FOR THE AWARD OF THE
DEGREE OF BACHELOR OF SCIENCE IN APPLIED COMPUTER SCIENCE
FIRST SEMESTER, 2023/2024**

(AUGUST-DECEMBER, 2023)

ACMP 355: NETWORK DESIGN MANAGEMENT

STREAM: Y3 S1

TIME: 2 HOURS

DAY: WEDNESDAY, 09:00–11:00 PM

DATE: 29/11/2023

INSTRUCTIONS

- 1. Do not write anything on this question paper.***
- 2. Answer Question ONE [Compulsory] and any other TWO Questions.***

QUESTION ONE

a) Define the following terms as used in computer networks

- Bandwidth (2mks)
- Network congestion (2mks)
- Data packet (2mks)

b) Discuss the requirements of a good network design (6mks)

c) Explain the role of a network system designer (6mks)

d) In the evolution of network designs explain the major developments in network architectures (6mks)

e) As a network designer, you are required to provide a rationale to an organizations' managers for a design to replace the organization's flat network topology with a hierarchical network topology. Describe three features of the hierarchical network design to convince the management that it is a better design choice (6mks)

QUESTION TWO

- a) Discuss IP multicasts in terms of the IP class and protocols they use (4mks)
- b) What are the factors to consider in choosing a routing protocol? (4mks)
- c) Briefly explain any three methods used to assign IP addresses. (4mks)
- d) Explain the solutions to the problem of excessive broadcasts in a network. (4mks)
- e) Compare between the layered models i.e OSI and the TCP/IP model (The Internet model). (4mks)

QUESTION THREE

- a) Give a brief account of the history of network systems (4mks)
- b) With suitable examples, discuss the main reasons why computers are networked (4mks)
- c) According to the IEEE, what is the criteria used to define a LAN? (4mks)
- d) Distinguish between the following terms and give examples:
 - i. a logical versus a physical topology (2mks)
 - ii. static versus dynamic addressing (2mks)
- e) With the use of well labeled diagrams differentiate the main networking topologies used in network systems (4mks)

QUESTION FOUR

- a) A network system can be described as virtual. Explain this concept (4mks)
- b) Identify and explain any three types of network switching mechanisms implemented in network systems (6mks)
- c) Organizations are rated in terms of their network sizes by the number of users and devices. Describe any three kinds of network sizes (6mks)
- d) Discuss Pricilla Oppenheimer's approach to network system design (4mks)

QUESTION FIVE

- a) Describe the data forwarding protocols used in the implementation of the following devices;
 - i) Switches (6mks)
 - ii) Routers (6mks)
- b) Given the IP address 192.168.1.15, answer the questions below:
 - i. If our network design requires 8 subnets, how many bit can we take from the host portion (1mk)

- ii. Using the answer in a) above, what is the subnet mask in decimal (1mk)
- iii. What is the number of usable hosts per subnet (2mks)
- iv. Write down the total number subnets that we will have and their IP addresses (4mks)