**CHUKA**                                           **UNIVERSITY**

## UNIVERSITY EXAMINATIONS

## FIRST YEAR EXAMINATION FOR THE AWARD OF MASTERS IN COMPUTER SCIENCE

**COSC 821: COMPUTER NETWORKS DESIGN AND MANAGEMENT**

**STREAMS: MSC COMP SCIENCE**

**INSTRUCTIONS**

### SECTION A-Compulsory (30 marks)

a.  A user would like to infer the path between two hosts; they suggest using the utility ping. Make your argument for why trace route is the more appropriate utility, comparing and contrasting their operation.                                (4 Marks)
b.  Distinguish between the following terms:                                (4 Marks)
    i.      Traffic monitoring verses performance monitoring
    ii.     Fault monitoring verses accounting monitoring
c.  Explain the following application layer protocols                       (6 marks)
    i.    TELNET
    ii.   DNS
    iii.  DHCP
d.  Explain Four benefits of Policy-based network management (PBNM)   (8 marks)
e.  Discuss four  issues to be considered while designing a transport layer protocol for Ad hoc wireless networks                                (8 marks)

## SECTION B

**Question two (15 marks)**

a)  It may happen that a sender sends the frame at a faster rate compared to the rate at which the receiver can receive the frames. Well, this may be the case where the sender is running on a much faster machine than the receiver. In such a situation, even if the transmission is error-free, it may happen that the receiver is unable to handle the frames at a faster rate and may lose some of them in the process. Explain two approaches to prevent the above situation.                                (6 marks)
b)  Data link layer design issues highlight the problems that network designers must address while designing the data link layer of any networking model. Using examples discuss the Data Link Layer Design Issues.    (9 marks)

**Question three (15 marks)**

a) The main function of the network layer is routing packets from the source machine to the destination machine. In most networks, packets will require multiple hops to make the journey. The algorithms that choose the routes and the data structures that they use are a major area of network layer design. Briefly explain three types of routing algorithms. (9 marks)

b) Explain three main problems of having a single broadcast domain, or a "flat network" (6 marks)

**Question four (15 marks)**

a) When one part of the subnet (e.g. one or more routers in an area) becomes overloaded, *congestion* results. Briefly explain some possible solutions towards congestion control over the network. ( 9 marks)

b) Explain various ways in which network performance can be affected by security problems (6 marks)

**Question five (15 marks)**

a) Monitoring tools are selected out of a variety of tools available today. Explain the features that should be considered while making the selection. (6 marks)

b) Explain three problems a network administrator will face without proper traffic analysis. (6 marks)

c) Explain two main techniques used for network traffic analysis. (3 marks)