National University of Computing and Emerging Sciences - CFD Campus

Computer Networks

Spring 2025

Assignment # 05

Submission Guidelines:

1. Submit your assignment as hardcopy in class as well as in soft copy on Google Classroom. Please submit your file in this format **22F_XXXX_A1**
2. The assignment should be on A4 pages.
3. Do not submit your assignment after the deadline. Late submission will not be accepted.
4. Plagiarism from internet (ChatGPT) or any peer is strictly prohibited.
5. In case of plagiarism zero marks will be awarded.

Question # 01. **(20)**

An organization is granted a block with one of the IP addresses as 150.100.80.0/22. The administrator wants to create 4 subnets with the following requirements:1st subnet needs at least 300 IP addresses, 2nd subnet needs at least 200 IP addresses, 3rdsubnet needs at least 100 IP addresses while 4th subnet needs at least 120 IP addresses. The following are required from you:

a) Write the subnet mask for each subnet.
b) Write the first and last IP address in each subnet (Network and Broadcast addresses).
c) Write the number of addresses in each subnet.
d) Write the range of valid host addresses in each subnet.

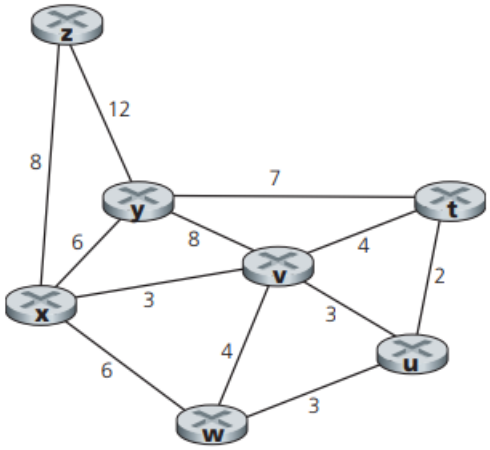
Question # 02. **(10)**

Differentiate between forwarding and routing. Write 3 points for each. Also states brief packet transfer scenario where these come into play.

Question # 03. **(10)**

Compare and contrast the IPv4 and the IPv6 header fields. Also, explain the use, weakness and advantage of each.

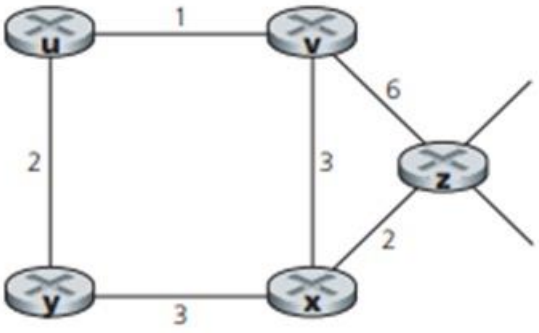
Question # 04. **(10)**



Consider the figure given above. Compute the shortest path from z to all network nodes using Dijkstra's algorithm.

Question # 05. **(10)**

Consider the network shown below, and assume that each node initially knows the costs to each of its neighbors. Consider the distance-vector algorithm and show the distance table entries at node z.



Good Luck ☺