National University of Computer and Emerging Sciences, Lahore Campus

|			
Course Name:	**Computer Networks**	**Course Code:**	**CS 3001**
Program:	**BS (Computer Science)**	**Semester:**	**Fall 2025**
Duration:	**20 minutes**	**Total Marks:**	**15**
Paper Date:	**13-November-2025**	**Section**	**5A , 5C**
Exam Type:	**Quiz 5 - Chapter 5**	**Page(s):**	**2**

Student Name　　　　　　　　**Roll No.**　　　　　　　**Section:**

Q1. Carefully read the Question/Diagram before attempting: [5 marks] [CLO 3]

Consider the AS topology (that uses BGP) shown below. AS1, AS2 and AS3 are access ISP's. AS4 and AS5 are regional ISP's. AS6 is a Tier-1 ISP. Recall the policies AS'es adopt when routing packets (also given in hints below). If there is a tie, assume that AS'es prefer paths with fewer hops. A few helpful hints/rules are as below:

- AS'es prefer customer routes since they are revenue-generating.
- Next in preference are peer routes, which are neutral cost.
- Least preferred are provider routes, as they incur cost.
- BGP prohibits AS'es from forwarding traffic between providers or peers if they are not customers.
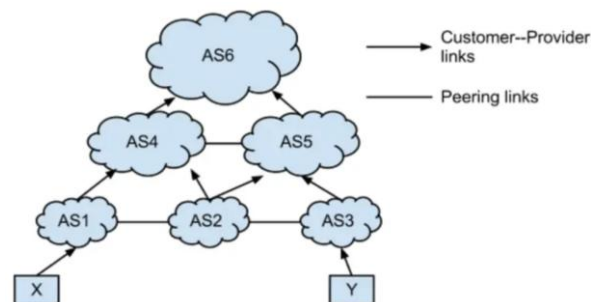
1. What path does a packet from host X to host Y take (must be in correct order)?

　

2. Considering the path from host X to host Y. Is it an example of **Hot Potato** routing or **Cold Potato** routing or **Neither**? Should this be classified as Intra-AS routing or Inter-AS routing or Neither?
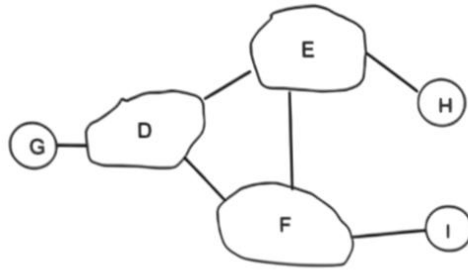

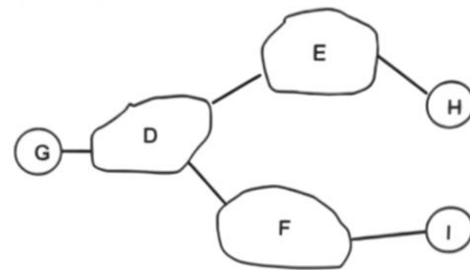**Q2: Draw Diagram and give justification:** [2 Marks] [CLO 1]

In the left Figure, Consider the path information that reaches stub networks G, H and I. Based on the information available at H. What is its view of Network Topology (for H only)?

Justify your answer. Topological view from G is shown below in right figure:

view from G

Diagram & Justification:	

Q3: Distance-Vector routing Algorithm (Bellman Ford):   **[1 + 3 + 4 Marks] [CLO 3]**
Consider a network where the Distance-Vector algorithm is used. There are 4 routers labeled A, B, C and D. Suppose their routing tables are as follows:

Forwarding table in A

Destination	Cost	Next Hop
A	0	-
B	3	B
C	4	C
D	5	C

Forwarding table in B

Destination	Cost	Next Hop
A	3	A
B	0	-
C	4	D
D	3	D

Forwarding table in C

Destination	Cost	Next Hop
A	4	A
B	4	D
C	0	-
D	1	D

Forwarding table in D

Destination	Cost	Next Hop
A	5	C
B	3	B
C	1	C
D	0	-

1. If a message originates in A and destination is D. Which path does it take (must be in correct order)? What is the total cost taken from A to D?

2. If at a point, link cost between B and D changes to 1. Suppose, B and D both notice the link cost change and update their forwarding tables immediately as follows:

Forwarding table in B

Destination	Cost	Next Hop
A	3	A
B	0	-
C	2	D
D	1	D

Forwarding table in D

Destination	Cost	Next Hop
A	4	B
B	1	B
C	1	C
D	0	-

Show the forwarding tables of A and C after they receive the distance-vector update message from B and D:

Forwarding table in A		
Destination	Cost	Next Hop
A	0	—
B	3	B
C	5	B
D	4	B

Forwarding table in C		
Destination	Cost	Next Hop
A	5	D
B	2	D
C	0	—
D	1	D

3. Assume that the link cost between B and D stays at 1. If a new router E is added to the network with two links to B and D. The cost between B and E is 5 and the link cost between D and E is 2. **Show the new entries (to destination E) added to forwarding tables A, B, C and D after the distance-vector updates and are stable?**

Forwarding table in A		
Destination	Cost	Next Hop
E	6	B

Forwarding table in B		
Destination	Cost	Next Hop
E	3	D

Forwarding table in C		
Destination	Cost	Next Hop
E	3	D

Forwarding table in D		
Destination	Cost	Next Hop
E	2	E

(Note: Feel free to use the rest of the available space/next page for Rough Work)