

## National University of Computer and Emerging Sciences, Lahore Campus

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

**Student Name**

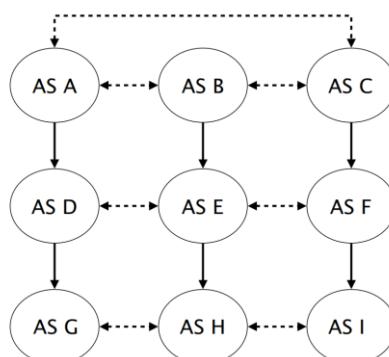
**Roll No.**

**Section:**

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

Consider the AS topology (that uses BGP) shown below. Single-headed plain arrows point from providers to their customers (AS-A is the provider of AS-D), while double-headed dashed arrows connect peers (AS-D and AS-E are peers). 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.



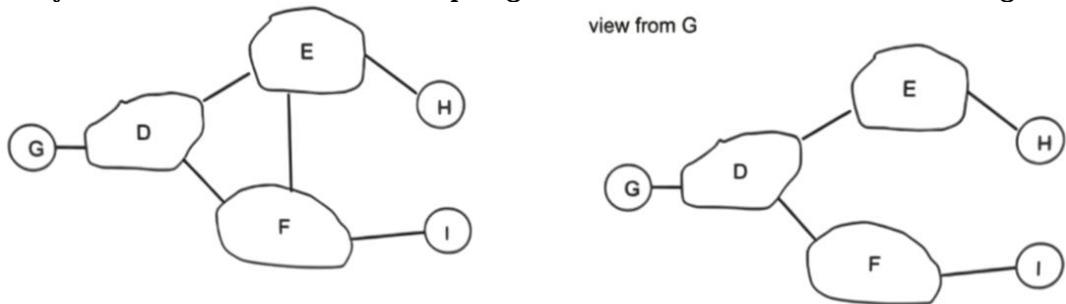
1. What path does a packet from AS-F to AS-D take (must be in correct order)?

2. What path does a packet from AS-D to AS-B take (must be in correct order)?

### **Q2: Draw Diagram and give justification: [2 Marks] [CLO 3]**

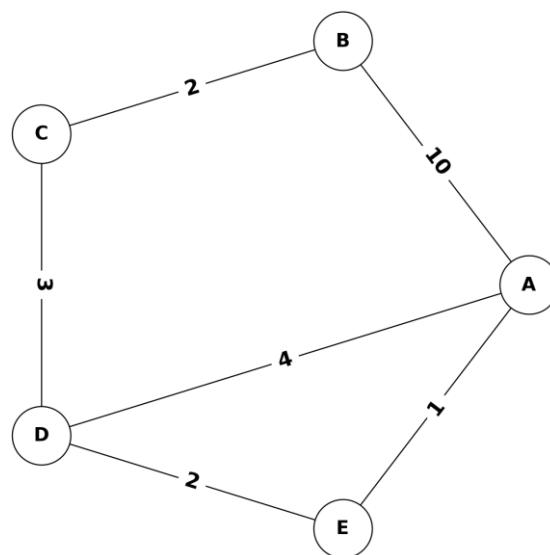
In the left Figure, Consider the path information that reaches stub networks G, H and I. Based on the information available at I. What is its view of Network Topology? Justify your

answer (justification in a few lines). Topological view from G is shown below in right figure:



**Diagram &  
Justification:**

**Q2: Distance-Vector routing Algorithm (Bellman Ford):** [7 + 1 Marks] [CLO 3]



Distance-Vector algorithm has to be performed starting with the initial table shown below, Entries in the table are in the form of **cost/next-hop** (you need to follow the same form). In

this problem node A receives vectors from node B, D and E. Fill in the tables below (the initial table has already been filled for your convenience).

Info at Node	Distance to reach Node (Initial Table)				
	A	B	C	D	E
A	—	10/B	$\infty$	4/D	1/E
B	10/A	—	2/C	$\infty$	$\infty$
C	$\infty$	2/B	—	3/D	$\infty$
D	4/A	$\infty$	3/C	—	2/E
E	1/A	$\infty$	$\infty$	2/D	—

Info at Node	Distance to reach Node (after 1 exchange)				
	A	B	C	D	E
A	—				
B		—			
C			—		
D				—	
E					—

Info at Node	Distance to reach Node (after 2 exchanges)				
	A	B	C	D	E
A	—				
B		—			
C			—		
D				—	
E					—

Forwarding table in B (initial)		
Destination	Cost	Next Hop
A		
C		
D		
E		

Forwarding table in B (1 exchange)		
Destination	Cost	Next Hop
A		
C		
D		
E		

Forwarding table in B (2 exchanges)		
Destination	Cost	Next Hop
A		
C		
D		
E		

Based on the above data, let's say that the algorithm stops after the 1st exchange (before completing a 2nd exchange). What is the path a packet takes when going from B to A (must be the exact path)? What is the total cost?

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**(Note: Feel free to use rest of the space/extra space for Rough Work)**