



**Daffodil International University**  
**Faculty of Science & Information Technology**  
**Department of Computer Science and Engineering**  
**Midterm Examination, Fall-2025**  
**Course Code: CSE225, Course Title: Data Communication**  
**Level: 2      Term: 2      Batch: 66**

**Time: 1 Hour and 30 Minutes**

**Marks: 25**

**Answer ALL Questions**

*[The figures in the right margin indicate the full marks and corresponding course outcomes.  
All portions of each question must be answered sequentially.]*

1	a)	<p>Daffodil International University is a technologically advanced institution with several <u>well-equipped laboratories</u>. In one such modern lab, named the Robotics Lab, <u>multiple high-configuration computers</u> are set up. Each computer is connected to a central networking device that manages the data flow between them. However, these computers are not allowed to communicate <u>within themselves</u>. Through this setup, <u>every computer</u> can share files with others and also <u>access a common printer</u> connected to the network.</p> <p><b>Analyze</b> the scenario and justify your answers</p> <ol style="list-style-type: none"><li>1. What type of network topology is being used in the Robotics Lab?</li><li>2. Why do you think this topology was chosen for this setup?</li><li>3. What could be the possible disadvantages of using this topology in such a lab environment?</li></ol>	3	CO1
	b)	<p>Assume ten devices are arranged in a mesh topology. How many cables are needed in total? How many ports are needed for each device?</p> <p><b>Analyze</b> the impact if one connection gets disconnected.</p>	2	
2	a)	<p><b>Identify</b> the following functions to the appropriate OSI model</p> <ul style="list-style-type: none"><li><input checked="" type="checkbox"/> A. It uses a mechanism to recognize duplicate frames.</li><li><input checked="" type="checkbox"/> B. Ensures reliable transmission of data ↑</li><li><input checked="" type="checkbox"/> C. Flow control at this layer is performed end to end rather than across a single link.</li><li><input checked="" type="checkbox"/> D. Data translation, encode and conversion.</li><li><input checked="" type="checkbox"/> E. It allows a user to log on to a remote host.</li><li><input checked="" type="checkbox"/> F. It allows a process to add a checkpoint.</li></ul>	3	CO2
	b)	<p><b>Compare and contrast</b> Encapsulation and Decapsulation in terms of peer to peer model. Draw figure if appropriate</p>	2	

3	a)	What will be the attenuation if a signal travels through a transmission medium and its power is reduced to one-half.	2	CO3
	b)	What is the transmission time of a packet sent by a station if the length of the packet is 1 million bytes and the bandwidth of the channel is 200 Kbps?	3	
4	a)	Implement the necessary calculations to find the capacity and signal level for a signal operating between 2 MHz and 4 MHz, given that SNR (in dB) is 50. <i>F</i>	3	
	b)	Explain different types of noises that might cause transmission impairment.	2	
5	a)	Analyze and Draw the Line Coding of the bits <u>100101010110</u> : I. Differential Manchester II. NRZ (I) III. MLT-3	3	
	b)	What is the maximum data rate of a channel with a bandwidth of 200 KHz if we use four levels of digital signaling? <i>B</i>	2	