Networking Basics and Data Link Layer Concepts

Instructions:

- *Attempt all questions. You should expect to spend ~1 minute per mark to write the answers.*
- *Please refer to the lecture materials and recommended references (see Course Outline) to find the answers. You are strongly advised NOT to search the internet for answers from unverified sources.*

1. [6 marks] Access Networks are primarily concerned with connecting users or end-systems to the Internet. What the three most common access network technologies that you use? What are the pros and cons of each technology that you experienced?
2. [4 marks] What was the first message sent on the Internet? Briefly explain how that came about?
3. [10 marks] What are the layers of the Internet Protocol stack and their respective responsibilities?
4. [6 marks] What are two reasons for using the layered protocol model/approach? Is there a disadvantage for using a layered approach?
5. [5 marks] Briefly explain, with the help of a diagram, the hidden terminal problem in wireless networks?
6. [6 marks] With the help of a diagram, explain the exposed terminal problem in wireless networks? Is the exposed terminal problem as bad as the hidden terminal problem? Briefly explain your answer.
7. [5 marks] In multiple access methods, what form of *channel partitioning* is similar to the "taking turns" approach? Briefly explain your answer.
8. [8 marks] Suppose we have the following bit pattern to be transmitted, 1010 0111 0101 1001, and an odd parity scheme is used.

1	0	1	0	p_1
0	1	1	1	p_2
0	1	0	1	p_3
1	0	0	1	p_4
q_1	q_2	q_3	q_4	

   (a) What would the value of the parity bits (p_1, p_2, p_3, p_4) and (q_1, q_2, q_3, q_4) be for the case of a 2-dimensional parity scheme?
   (b) Show how a single-bit error can be detected and corrected.
   (c) Show how a double-bit error can be detected but not corrected.