Name _____

CS4516 D12
Advanced Computer Networks
Final Exam
May 1, 2012

Question	Points	Score
0	1	
1	4	
2	5	
3	4	
4	6	
5	15	
6	5	
7	12	
8	13	
9	5	
10	5	
11	14	
12	12	
Total		

Trivia Question (1 extra credit point)

0.a Who were Richard Nixon's Vice Presidents.

or

0.b Which country will host the soccer World Cup in 2022?

(4 pts) 1. Define **relative propagation time**. Explain its impact on **LAN utilization**.

(5 pts) 2. Explain how **binary exponential backoff** works in **Ethernet**.

(4 pts) 3. Source routing is used in **bridges** and **MANET's**. Explain how **source routing** works in either context.

(6 pts) 4. List the differences between **802.11g** and **802.11n wireless networks**.

(8 pts) 5a. Explain the **RTS/CTS** mechanism. How does **RTS/CTS** improve or worsen **DCF** performance?

(2 pts) 5b. What is a **DIFS**?

(5 pts) 5c. Discuss the differences between the architecture of **2.5G** and **3G cellular networks**.

(5 pts) 6. Draw a diagram that shows and labels the steps taken for a **correspondent** to talk with a **mobile wireless client** in a **visited** network via **direct mobile routing**.

(6 pts) 7a. What is **idle listening** in a **wireless sensor network**? Why is it a concern for **WSN** performance?

(6 pts) 7b. Two general **WSN** techniques to reduce **idle listening** are: **scheduling** and **Low Power Listening**. Draw diagrams of **S-MAC** and **LPL** and use them to explain the differences between the two general **WSN** techniques.

(4 pts) 8a. Explain the differences in the roles of an **interface provider** and **interface user** with respect to **commands** and **events** in **TinyOS**.

(4 pts) 8b. Use the **AM Send Interface** to demonstrate the concept of **split-phase** in **TinyOS**.

(5 pts) 8c. Explain how variable typing in **nesC** and the **AM Receive Packet Interface** enables a **TinyOS receive handler** to extract the **payload** from a **received AM packet**.

(5 pts) 9. Draw a figure and explain the basic operation of a **Gigabit Ethernet buffered distributor**.

(5 pts) 10. Explain the reasons for and the issues addressed in the design of **4B/5B encoding** in **FDDI**.

(6 pts) 11a. Explain basically how **SONET** works in converting three incoming **STS-1** streams into a single outgoing **STS-3** stream.

(3 pts) 11b. Draw a **detailed** diagram of the **STS-3** frame. Use the diagram to explain:

(3 pts) 11c. the concept of the **Synchronous Payload Envelope**.

(2 pts) 11d. the interface between **SONET** and **ATM switches**.

(6 pts) 12a. Explain the difference between **VPI's** and **VCI's** and how this concept provides for two levels of **ATM switches**.

(6 pts) 12b. Explain the criticism leveled by the computer science community at the design of **ATM AAL3/4**. How was this design improved in **AAL5**?