Ph.D. Qualifying Exam: Computer Networks
Department of Computer Science and Engineering,
National Sun Yat-sen University

1. Physical Layer (20%):

(1) Explain the five parameters used to describe a periodical signal. (5%)

(2) What are the three types of slow fading? How do they occur? (6%)

(3) What are the purposes of channel coding and line coding? (4%)

(4) Why do we need spread spectrum? Give three methods for the technique. (5%)

2. Link Layer (20%):

(1) Why do we need guard bands in an FDMA system? (2%)

(2) What is the near-far problem in a CDMA system? (3%)

(3) Give the five major jobs of a link layer. (5%)

(4) Explain how CSMA/CD works in Ethernet. Can it be used in a WLAN? Why or why not? (6%)

(5) Why does Wi-Fi need to define the extended service set (ESS)? (4%)

3. Network Layer (20%):

(1) Draw the address formats of five classes in IPv4, and also point out the range of IP addresses supported by each class. (10%)

(2) In IGMP, what is the querier's job? Who will serve the querier in an IP subnet? (4%)

(3) What are the two types of care-of addresses in mobile IP? How to get them? (4%)

(4) What is anycast? (2%)

4. Transport Layer (20%):

(1) Please draw the state transition diagram of TCP Reno. You need to specify each event to trigger state transition. (10%)

(2) Explain the four major jobs of a transport layer. (4%)

(3) How do you calculate UDP checksum? (3%)

(4) Why do we need the option of window scale factor in TCP? (3%)

5. Application Layer (20%):

(1) In HTTP, what do the response codes of 1xx, 2xx, 3xx, 4xx, and 5xx mean? (10%)

(2) What are the four types of servers in terms of their communication styles? (4%)

(3) What are the three parts of a URI (uniform resource identifier)? (6%)