國立中山大學資訊工程學系
104 學年度第 1 學期博士班資格考試

科目：電腦網路

1. What is P2P architecture? What is client-server architecture? What is hybrid of client-server and P2P?
2. What is TCP? What is UDP? Why do we need two different transport layer protocols, UDP and TCP? If you are asked to develop a new protocol to replace these two transport layer protocols, what new characteristics would you suggest to add?
3. What is packet switching? What is circuit switching? Please compare the advantages and disadvantages of both. Please then briefly introduce network (internet) structure.
4. There are seven layers in ISO/OSI model. Please explain them briefly from application layer to physical layer. What are the advantages of dividing the network protocol into layers? What are the possible problems behind it? Please also compare it with today's internet protocol stack.
5. A router consists of input ports, high-speed switching fabric, routing processor, and output ports. Please draw a block diagram for a router which include above mentioned modules and explain each module, respectively.
6. Please write the pseudo code for CSMA/CD. What is CSMA/CA? Please use graph to demonstrate the advantage of using CD and CA, respectively.
7. TCP can realize reliable transmissions under the unreliable physical channel by utilizing ACKs, checksum, sequence number, retransmission, and timeout. Please draw pictures to explain the necessity to realize reliable transmissions for each of the above five mechanism.
8. Encapsulation is a technique used again and again by network designers. VLAN (IEEE 802.1q) is an example for using the technique. Please explain how does VLAN work? In MOD, we know that the MOD setup box has to connect to outside networks directly so we can configure the setup box successfully. But because of the floor layout, we have to connect our MOD setup box S behind a switch X in the second floor, which is connected to ADSL modem M in the first floor. And the ADSL modem M is then connected to external networks. Please explain how can we use a managed switch which support VLAN to meet our requirements?
9. Are the following figures for selective repeat correct? Please explain the operations of selective repeat by using those two figures and identify and correct errors if there are.

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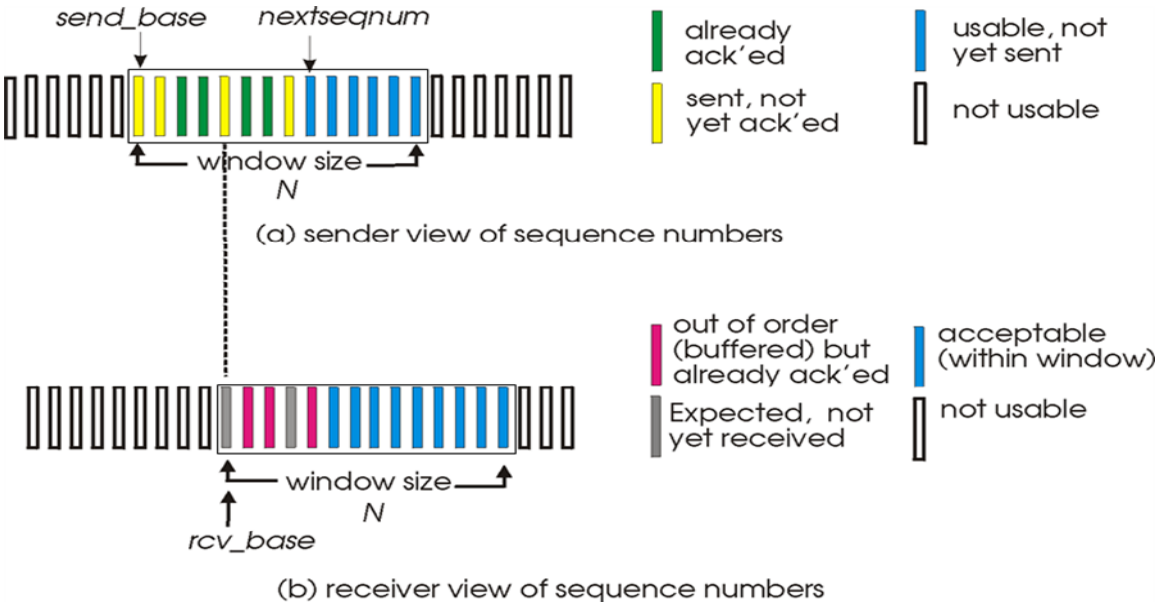

10. Please use the link state (Dijkstra) algorithm to construct the routing paths step by step (beginning from u).