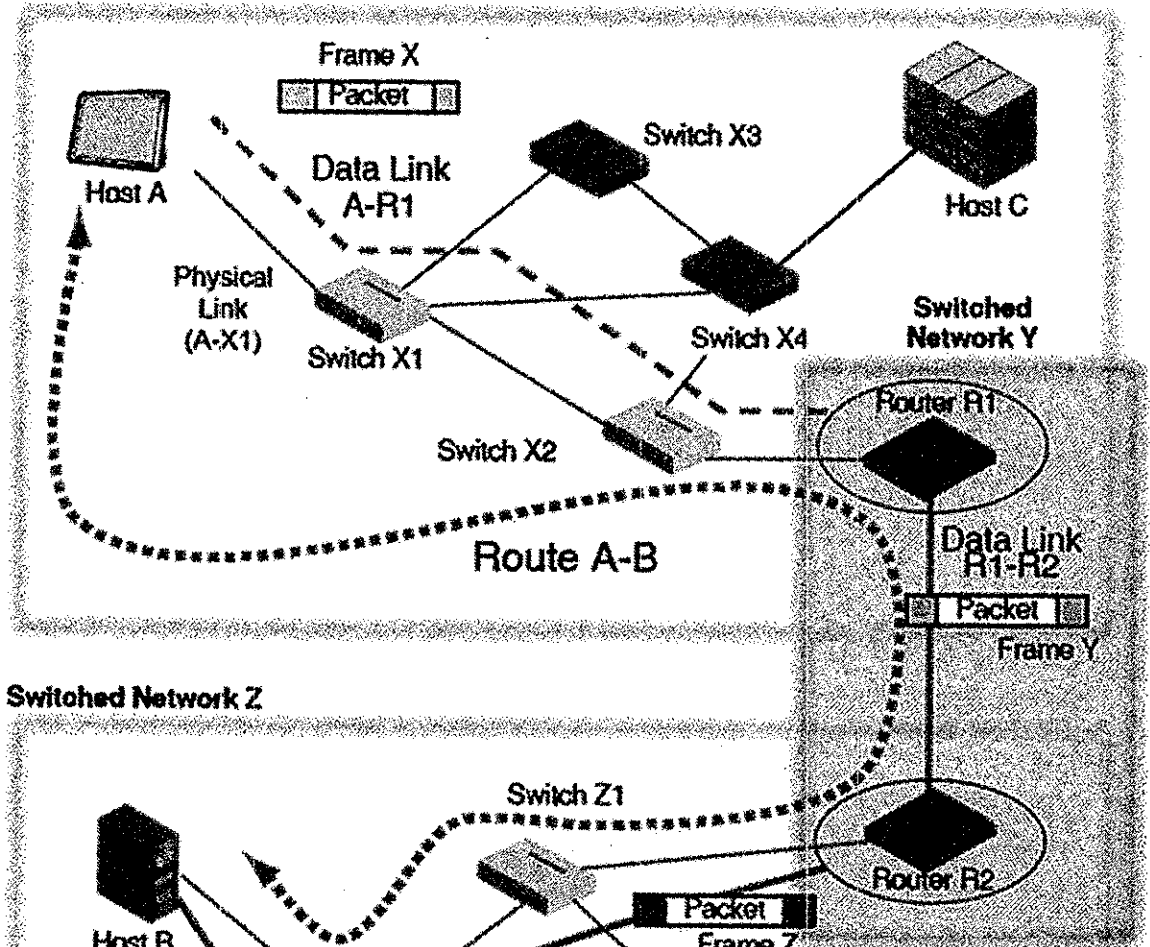


※ 考生請注意：本試題不可使用計算機。請於答案卷(卡)作答，於本試題紙上作答者，不予計分。

1. Compare and contrast hub, switch and router (12 points) and what are main differences between a switching table and a routing table (8 points)
2. What is Internet of Things (IoT)? (8 points) What are main applications of IoT? (8 points)
3. Describe and depict three-step open and four-step close over a TCP connection, (each for 7 points), explain why TCP requires such complicated opening and closing processes (5 points) and what kind of impacts if we simplify both processes without acknowledge. (5 points)
4. Undersea cables are used to transport certain portion of global Internet traffics and can be damaged by natural disasters and human behaviors (fishing, anchors, dredging). Such incidents are likely the main reasons that Internet access confronts much longer ping time and other QoS problems. If a specific submarine cable is disrupted, traffic must be re-routed to other routes (other submarine cables or through satellite communication)
  - a. What is the latency for a VoIP packet sent from Taipei to Los Angeles through a direct undersea cable between Taipei and Los Angeles? (6 points) Packet size of VoIP is 56 bytes, propagation speed of the undersea cable is about 80% speed of light, the distance between Taipei and Los Angeles is 6770 miles. The channel throughput is 5%, there are 24,000 VoIP packets in a minute, and the available channel bandwidth of this undersea cable is 2 MHz, what is the minimum SNR. (6 points)
  - b. If an earthquake damages the undersea cable and disrupts its connection, the VoIP service is re-routed by a geostationary satellite link, what is the latency of this VoIP packet? (Distance between earth and geostationary satellite is 35,863 km, available bandwidth of this satellite link is 11.2 kbps) (5 points)
  - c. Compare your answers (a & b) to explain any potential problems of undersea cable disruption. (5 points)
5. Based on the following figure to tell how many physical links, data links and routes (18 points)
  1. From Host A to Host C
  2. From Host A to Host D
  3. From Host B to Host D

Switched Network X



Switched Network Z

