企業資訊通訊與網路 期末考 (109-1)

A. 填充 (Fill in the Blanks) (30%)

1. "fe80::c2f:a4:300" is the simplified representation of IPv6 address: _____.

2. 10.34.65.117 bitwise-AND 255.255.240.0 = _____.

3. By inverse square law attenuation in wireless communication, the signal strength at 2 meters is 80 mW. The signal strength at 8 meters would be _____ mW.

4. _____ is transmission with channel bandwidth much wider than required for the signal's speed.

5. When an IPv6 packet is forwarded by a router, the _____ field in the IPv6 header of the packet will be decreased by one.

6. _____ is a protocol, usually used by routers, to send error, e.g. host unreachable, or supervisory messages.

7. In the _____ mode of IPsec, only the two IPsec gateways need digital certificates.

8. To connect to all sites of a company via PSDN, each site uses a _____ line, as an access line, to connect to ISP's nearest POP.

9. _____ is a routing mechanism. It inserts a label in front of the IP header. Routing is performed via the label.

10. _____ provides residential Internet access over one-pair voice-grade UTPs and offers high downstream speeds but limited upstream speed.

B. 簡答 (Short Answer) (73%)

1. 802.11 operates in 2.4GHz and 5 GHz bands. (6%)
   (1). What is the main advantage of 2.4GHz operation?
   (2). What is the main advantage of 5GHz operation?

2. *EMI, Dead(shadow) zones, Inverse square law attenuation, Absorptive attenuation, and Multipath Interference* are the five wireless propagation problems. (9%)
   (1). What is *Multipath Interference*?
   (2). Which two problems get worse as frequency increases?

3. Assume your company uses private IP addresses 10.x.x.x. (6%)
   (1). If you need at least 50 subnets, how many bits are needed for the subnet part of a 32-bit IP address?
   (2). Following (1), how many hosts can you have per subnet?

4. Answer the following questions in BitTorrent P2P file retrieval. (6%)
   (1). What is a tracker?
   (2). What is a swarm?

5. CSMA/CA+ACK is the MAC scheme used by 802.11 WLANs. (6%)
   (1). What does "Carrier Sense Multiple Access" mean?
   (2). CA means Collision Avoidance. How can collisions be avoided?

6. Explain the following header fields. (9%)
   (1). Sequence Number (in TCP)
   (2). TTL (in IPv4)
   (3). Next Header (in IPv6)

7. PSK and 802.1X are the two 802.11i modes. (6%)

   (1). Which is better for a company with many access points?

   (2). How does the PSK mode work?

8. The following table shows a part of a routing table. Suppose the metric is _speed_. (9%)

Row	Destination	Subnet mask	Metric (speed)	Interface	Next Hop
1	0.0.0.0	0.0.0.0	6	1	163.22.1.254
2	156.0.0.0	255.0.0.0	10	6	156.1.1.254
3	156.63.0.0	255.255.0.0	12	5	156.63.1.254
4	156.63.0.0	255.255.0.0	18	8	156.19.1.254
5	156.110.0.0	255.255.0.0	12	9	156.22.2.1
6	156.110.45.0	255.255.255.0	25	2	local
7	156.114.0.0	255.255.0.0	12	3	156.25.1.254
8	156.114.24.0	255.255.255.0	21	7	local
9	156.114.26.0	255.255.255.0	36	4	156.114.2.1
10	156.114.26.0	255.255.255.0	30	3	156.114.3.252

   (1). Which row(s) are matched and which row will be selected for destination address = 156.114.26.9 ?

   (2). Which row(s) are matched and which row will be selected for destination address = 156.110.45.7 ?

   (3). Which row(s) are matched and which row will be selected for destination address = 156.63.1.2 ?

9. (1) What are (a), (b), and (c) in the sequence of SMTP commands for sending an e-mail from John to Mary?

   (2). What are (d) and (e) in an HTTP request message for retrieving web page "http://abc.com/news.html".

   (10%)

```
HELO pc-John                         __(d)__  /news.html HTTP/1.1
__(a)__  FROM: John@ncnu.edu.tw      __(e)__  : abc.com
__(b)__  TO: Mary@gmail.com          Connection: keep-alive
DATA
(The E-mail message is put here.)
[CRLF]__(c)__ [CRLF]
QUIT
```

10. SIP and RTP are the signaling and transport protocols of VoIP respectively. (6%)

   (1). How does a caller make a call to a callee via two proxy servers?

   (2). VoIP transport uses RTP over UDP. Why is UDP used, instead of TCP?