※ 注意：請用 2B 鉛筆作答於答案卡，並先詳閱答案卡上之「畫記說明」。

Part I.單選題（每題 2%, 請在答案卡上作答）

1. Which of the following network entities do not belong to the network edge?
   (A) router (B) Web server (C) laptop (D) workstation (E) cellular phone
2. Which of the following notion is not a property of packet switching?
   (A) packet drop (B) statistical multiplexing (C) queuing delay (D) resource contention (E) call reject
3. Which of the following is not a quality of service that protocol designers should concern?
   (A) delay (B) bandwidth requirement (C) cost (D) delay jitter (E) data loss
4. Which of the following is not a client-server application?
   (A) Email (B) Web (C) DNS (D) BitTorrent (E) FTP
5. Which of the following is an application layer protocol?
   (A) NAT (B) FTP (C) Web (D) Email (E) ping
6. What is the default port number the Web server is running on?
   (A) 21 (B) 80 (C) 25 (D) 60 (E) 88
7. Which of the following is the application protocol supporting the Web application?
   (A) HTML (B) HTTP (C) URL (D) XML (E) Apache
8. Which of the following entities are not involved in DNS name resolution process?
   (A) root DNS server (B) local DNS server (C) top-level domain DNS server (D) authoritative DNS server (E) proxy DNS server
9. Suppose packets are transferred in a pipelined fashion with a window of size N, which of the following transport mechanism requires N TIMEOUT timer?
   (A) TCP (B) UDP (C) Go-Back-N (D) Selective Repeat (E) Stop and Wait
10. Suppose the current window size of TCP is cwnd. What is the new window size when a new acknowledgement is received in congestion avoidance phase?
    (A) cwnd+1 (B) 2cwnd (C) 1 (D) cwnd+1/cwnd (E) cwnd/2
11. Suppose the current window size of TCP is cwnd. What is the new window size when a new acknowledgement is received in slow start phase?
    (A) cwnd+1 (B) 2cwnd (C) 1 (D) cwnd+1/cwnd (E) cwnd/2
12. Suppose the current window size of TCP is cwnd. What is the new window size when three duplicate acknowledgements are received?
    (A) cwnd+1 (B) 2cwnd (C) 1 (D) cwnd+1/cwnd (E) cwnd/2
13. Suppose the current window size of TCP is cwnd. What is the new window size when the TIMEOUT timer expires?
    (A) cwnd+1 (B) 2cwnd (C) 1 (D) cwnd+1/cwnd (E) cwnd/2
14. Suppose the current window size of TCP is cwnd. What is the new slow start

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threshold when three duplicate acknowledgements are received?
(A) cwnd+1 (B) 2cwnd (C) 1 (D) cwnd+1/cwnd (E) cwnd/2

15. Suppose the current window size of TCP is cwnd. What is the new slow start threshold when the TIMEOUT timer expires?
(A) cwnd+1 (B) 2cwnd (C) 1 (D) cwnd+1/cwnd (E) cwnd/2

16. What is the largest possible number of hosts on this network, 140.112.42.0/24?
(A) 1024 (B) 512 (C) 256 (D) 128 (E) 64

17. Which of the following is not an IP address on the Internet?
(A) 140.112.41.120 (B) 140.256.32.138 (C) 140.12.44.1 (D) 212.240.188.248 (E) 128.192.1.1

18. Which of the following is not a broadcast message?
(A) DHCP discover (B) DHCP offer (C) DHCP request (D) DHCP acknowledgement (E) none of the above

19. Which of the following is in the IPv4 header but not in the IPv6 header?
(A) checksum (B) source address (C) destination address (D) source port number (E) destination port number

20. Which of the following is an intra-AS unicast routing protocol?
(A) DVMRP (B) RIP (C) BGP (D) PIM (E) MOSPF

21. Which of the following is an inter-AS unicast routing protocol?
(A) DVMRP (B) RIP (C) BGP (D) PIM (E) MOSPF

22. Which of the following does not result in shortest path routing?
(A) DV (B) RIP (C) BGP (D) LS (E) OSPF

23. Which of the following is not an error detection mechanism?
(A) CRC (B) parity check (C) Internet checksum (D) Hamming distance (E) two-dimension parity check

24. Which of the following is more appropriate to disseminate data to a small group of receivers spanning a very large network?
(A) PIM-Sparse Mode (B) PIM-Dense Mode (C) DVMRP (D) IGMP (E) IGRP

25. Which of the following is not a random access MAC protocol?
(A) CSMA/CD (B) CSMA (C) Aloha (D) TDMA (E) CSMA/CA

26. Which of the following is not a partition-based MAC protocol?
(A) slotted Aloha (B) CDMA (C) TDMA (D) FDMA (E) none of the above

27. Which of the following is the mechanism in Ethernet to inform every host on the LAN there is a collision?
(A) preamble (B) jam signal (C) exponential backoff (D) carrier sense (E) all of the above

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28. Which of the following is the mechanism in Ethernet to avoid the initial data from colliding with other data on the LAN?
(A) preamble (B) jam signal (C) exponential backoff (D) carrier sense (E) all of the above
29. Which of the following is the mechanism in Ethernet to avoid the retransmitted data from colliding with other data on the LAN?
(A) preamble (B) jam signal (C) exponential backoff (D) carrier sense (E) all of the above
30. Which of the following is the mechanism in Ethernet to allow synchronization of sender's and receiver's clocks?
(A) preamble (B) jam signal (C) exponential backoff (D) carrier sense (E) all of the above

Part II. 複選題（每題 4%, 請在答案卡上作答）

31. Which of the following the persistent connection in HTTP helps reducing for Web downloads?
(A) number of TCP connections (B) number of HTTP requests (C) number of connection setups (D) download time (E) RTT
32. Which of the following the pipelining HTTP requests helps reducing for Web downloads?
(A) number of TCP connections (B) number of HTTP requests (C) number of connection setups (D) download time (E) RTT
33. Which of the following are mail access protocols?
(A) SMTP (B) ICMP (C) POP3 (D) HTTP (E) IMAP
34. Which of the following are peer-to-peer applications?
(A) MSN (B) Skype (C) World of Warcraft (D) Facebook (E) Foxy
35. Which of the following are not pipelined reliable transfer protocols?
(A) stop and wait (B) go-back-N (C) selective repeat (D) TCP (E) UDP
36. Which of the following transport protocols use cumulative acknowledgements?
(A) stop and wait (B) go-back-N (C) selective repeat (D) TCP (E) UDP
37. Which of the following are features of TCP?
(A) delayed acknowledgement(B) cumulative acknowledgements (C) 2-way handshakes (D) flow control (E) congestion control
38. Which of the following are problems of link state routing protocols?
(A) count to infinity (B) route oscillation (C) transient routing loops (D) topology information storage (E) path error propagation

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39. *Which of the following are problems of distance vector routing protocols?*
(A) count to infinity (B) route oscillation (C) transient routing loops (D) topology information storage (E) path error propagation

40. Which of the following result in the sending an acknowledgement packet for each data packet received in CSMA/CA?
(A) hidden terminal (B) signal fading (C) channel noise (D) collision (E) packet loss

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