

西安电子科技大学  
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考试时间 120 分钟

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试 题

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题号	一 选择题	二、计算和应用题						总分
		1	2	3	4	5	6	
分数								
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		一	2	3	四	5	6	
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1. 考试形式：闭卷 ☐ 开卷 ☐ ； 2. 本试卷共二大题，满分 100 分；

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3. 考试日期：2022 年 月 日； （答题内容请写在装订线外）

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I. Single Choice Question (1.5 points for each question, 30 points in total)

II. 单项选择题(每题 1.5 分，共 30 分)

1. In the following description of the functions of each OSI layer, the INcorrect statement is\_.

2. 在下面对 OSI 各层功能的描述中，不正确的说法是。

A. The physical layer uses the transmission medium to transmit bit sequence.

B. 物理层使用传输介质传输比特序列。

C. The data link layer makes the error physical line into an error free data link.

D. 数据链路层使错误物理线路成为无错误数据链路。

E. The network layer has the functions of routing, packet forwarding, error control and so on.

F. 网络层具有路由、包转发、差错控制等功能。

G. The transport layer provides reliable "end-to-end" communication services.

H. 传输层提供可靠的“端到端”通信服务。

3. For a bandpass signal with a bandwidth of 100kHz and a minimum frequency of 150kHz, which of the following is its Nyquist sampling rate? \_\_\_\_\_

4. 对于带宽为 100kHz、最低频率为 150kHz 的带通信号，其奈奎斯特采样速率是以下哪一项？  
\_\_\_\_\_

A. 200k samples/s    B. 300k samples/s    C. 400k samples/s    D. 500k samples/s  
B. 20 万样本/秒    B. 30 万样本/秒    C. 40 万样本/秒    D. 50 万样本/秒

5. The INCORRECT statement in the following description is\_\_\_\_\_.

6. 下列描述中不正确的说法是\_\_\_\_\_。

A. Transmission rate refers to the number of binary bits that the transmission system can transmit per second.

B. 传输速率是指传输系统每秒可以传输的二进制位数。

C. Transmission rate is one of the important technical parameters to describe data transmission system.

D. 传输速率是描述数据传输系统的重要技术参数之一。

E. The unit of propagation rate is bit/s.

F. 传播速率的单位是比特/秒

G. The propagation rate is related to distance.

H. 传播速度与距离有关。



14. 以下哪个字段与 IP 数据包的分段和重组无关? \_\_\_\_\_

- A. Identification**      **B. Flags**      **C. Fragmentation offset**      **D. Survival time**  
**B. 标识**   **b . 标志**   **c . 碎片偏移**   **d . 存活时间**

15. The application PING sends\_\_message.

16. PING 发送的应用程序\_消息。

- A. TCP request      B. TCP response      C. ICMP request      D. ICMP response**  
**B. TCP 请求 B. TCP 响应 C. ICMP 请求 D. ICMP 响应**

17. When a host moves from one network to another network with a different network address, which of the following statement is correct?

18. 当主机从一个网络移动到另一个具有不同网络地址的网络时，下列哪种说法是正确的？\_\_\_\_\_

- A. IP address will change.**  
**B. IP 地址将会改变。**

- C. MAC address will change.  
D. MAC 地址将会改变。

- E. Both IP address and MAC address will change.  
F. IP 地址和 MAC 地址都会改变。

- G. Neither IP address nor MAC address will change.**  
**H. IP 地址和 MAC 地址都不会改变。**

19. The main function of ARP protocol is\_\_\_\_\_.

20. ARP 协议的主要功能是。 \_\_\_\_\_

A. resolving IP address to physical address

B. resolving physical address to IP address

B. 将 IP 地址解析为物理地址 b . 将物理地址解析为 IP 地址

C. resolving host name to IP address

D. resolving IP address to host name

C. 将主机名解析为 IP 地址

21. Which of the following statement is correct? \_\_\_\_\_

22. 以下哪个陈述是正确的? \_\_\_\_\_

A. IP packets can be fragmented by the source host and reorganized by routers.

B. IP 数据包可以由源主机分段，并由路由器重组。

C. IP packets can be fragmented by routers and reorganized by the destination host.

D. IP 数据包可以由路由器分段，然后由目的主机重组。

E. IP packets can be fragmented and reorganized by intermediate routers.

F. 中间路由器可以对 IP 数据包进行分段和重组。

G. IP packets can be fragmented by intermediate routers and reorganized by the last router.

H. IP 数据包可以由中间路由器分段，并由最后一个路由器重组。

23. A department applied for a class C address to divide into 16 subnets with the same number of addresses. The subnet mask should be\_\_\_\_\_.

24. 某部门申请将一个 C 类地址划分为 16 个地址数量相同的子网。子网掩码应该是\_\_\_\_\_。

A. 255.255.255.0

B. 255.255.255.192

C. 255.255.255.240

D. 255.255.255.255

A. 255. 255 . 255. 0 b . 255. 255 . 255. 192 c . 255. 255. 255. 240 d . 255. 255. 255. 255

25. A TCP connection has established between host A and host B. Host A sends two TCP

segments to host B, including 400 bytes and 500 bytes of data respectively. The sequence number of the first segment is 300. Host B correctly received the two segments and sends the acknowledgment to host A, and the acknowledgment number is\_\_\_\_\_.

26. 主机 A 和主机 B 之间建立了 TCP 连接。主机 A 向主机 B 发送了两个 TCP 数据段，分别包含 400 字节和 500 字节的数据。第一段的序列号是 300。主机 B 正确接收了这两个数据段，并向主机 A 发送确认，确认号为\_\_\_\_\_。

- A. 700                      B. 800                      C. 900                      D. 1200**  
A. 公元前 700 年至公元前 800 年

27. Host A expects to establish a TCP connection with host B by sending a TCP segment (SYN=1, seq=2021). If host B accepts the connection request, which of the following could be the correct TCP when host B sending back to host A? \_\_\_\_\_

28. 主机 A 希望通过发送 TCP 数据段 (SYN=1, seq=2021) 与主机 B 建立 TCP 连接。如果主机 B 接受连接请求，当主机 B 向主机 A 发送回连接请求时，下列哪一项可能是正确的 TCP? \_\_\_\_\_

- A. SYN=0, ACK=0, seq=1234, ack=2022**  
A. SYN=0, ACK=0, seq=1234, ack=2022
- B. SYN=1, ACK=1, seq=24689, ack=2022**  
B. SYN=1, ACK=1, seq=24689, ack=2022
- C. SYN=1, ACK=1, seq=12340, ack=2021**  
C. SYN=1, ACK=1, seq=12340, ack=2021
- D. SYN=1, ACK=0, seq=8734, ack=2021**  
D. SYN=1, ACK=0, seq=8734, ack=2021

29. There are two subnets 202.118.133.0/24 and 202.118.130.0/24. If route aggregation is performed, which of the following is the correct network address? \_\_\_\_\_

30. 有两个子网 202. 118. 133. 0/24 和 202. 118. 130. 0/24。如果执行路由聚合，以下哪一项是正确的网络地址? \_\_\_\_\_

A. 202.118.128.0/21    B. 202.118.128.0/22    C. 202.118.130.0/22    D. 202.118.130.0/20  
A. 202. 118. 128. 0/21

31. Regarding the NAT protocol, which of the following statements is correct? \_\_\_\_\_

32. 关于 NAT 协议，下列哪个陈述是正确的? \_\_\_\_\_

A. NAT can convert between internal IP address and internal MAC address.

B. NAT 可以在内部 IP 地址和内部 MAC 地址之间转换。

C. NAT can convert between internal IP address and external MAC address.

D. NAT 可以在内部 IP 地址和外部 MAC 地址之间转换。

E. NAT can convert between domain name address and IP address.

F. NAT 可以在域名地址和 IP 地址之间转换。

G. NAT can convert between internal private IP address and external public IP address.

H. NAT 可以在内部私有 IP 地址和外部公有 IP 地址之间转换。

33. In the following description of FTP, the INcorrect statement is\_\_\_\_\_.

34. 在下面对 FTP 的描述中，不正确的说法是\_\_\_\_\_。

A. FTP uses control connection and data connection to complete file transfer.

B. FTP 使用控制连接和数据连接来完成文件传输。

C. The well-known port number used by the FTP server to control the connection is 21.

D. FTP 服务器用来控制连接的众所周知的端口号是 21。

E. The well-known port number used by the FTP client to control the connection is 20.

F. FTP 客户端用来控制连接的众所周知的端口号是 20。

**G. The control connection in FTP keeps connecting during the FTP session.**

**H. FTP 中的控制连接在 FTP 会话期间保持连接。**

**35. Which of the following equipment can be used to interconnect LANs of the Administrative Building and the Laboratory Building in a school? \_\_\_\_\_**

**36. 下列哪种设备可以用来连接学校行政大楼和实验楼的局域网? \_\_\_\_**

- A. Switch                      B. MODEM                      C. Repeater                      D. Network card**  
**B. 交换机 b . 调制解调器 c . 中继器 d . 网卡**

**37. Which of the following does not belong to the functions of the data link layer? \_\_\_\_\_**

**38. 下列哪一项不属于数据链路层的功能? \_\_\_\_\_**

- A. Framed                      B. Reliable transmission                      C. Flow control                      D. Route selection**  
**B. 帧 b . 可靠传输 c . 流量控制 d . 路由选择**

**39. The access control protocol used by wireless LAN in MAC sublayer is\_\_\_\_\_.**

**40. 无线局域网在 MAC 子层使用的访问控制协议是\_\_\_\_\_。**

- A. CSMA/CA                      B. CSMA/CD                      C. ALOHA                      D. Slotted ALOHA**  
**A. CSMA/CA B. CSMA/CD C 阿罗哈 D 开槽阿罗哈**



### III. Calculation and Application Questions (70 points in total)

#### IV. 计算和应用问题(共 70 分)

1. In a network using CSMA / CD protocol, the transmission medium is a whole cable and the transmission rate is 1G bit/s. The signal propagation rate in the cable is 200,000 km/s. If the minimum data frame length is reduced by 800 bits, should the distance between the farthest two stations increase or decrease? How many meters is this change? (9 points)

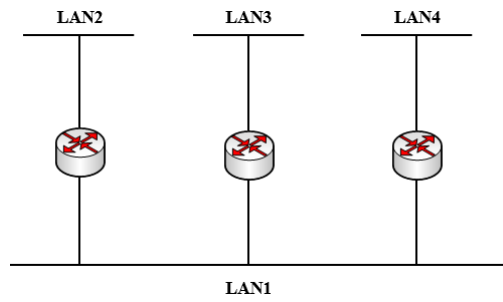
2. 在使用 CSMA / CD 协议的网络中, 传输介质为一整根电缆, 传输速率为 1G bit/s, 电缆中信号传播速率为 200000km/s, 如果最小数据帧长度减少 800 bits, 那么最远的两站之间的距离应该增加还是减少? 这是多少米的变化? (9 分)

3. Please draw the waveforms of Manchester code and Differential Manchester code of data stream 10100111, assuming the initial state is high level. (10 points)

4. 请画出数据流 10100111 的曼彻斯特码和差分曼彻斯特码的波形, 假设初始状态为高电平。  
(10 分)

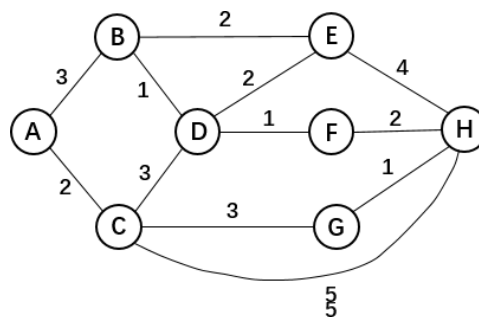
**5. An autonomous system with IP address 61.138.118.23/23 has 4 LANs, and there are 165, 93 and 80 hosts from LAN2 to LAN4 respectively. Please list the network address, subnet mask and IP address range of each LAN. (10 points)**

**6. 一个 IP 地址为 61.138.118.23/23 的自治系统有 4 个 LAN，从 LAN2 到 LAN4 分别有 165、93 和 80 台主机。请列出每个局域网的网络地址、子网掩码和 IP 地址范围。(10 分)**



7. Please make the minimum cost routing table by Dijkstra routing algorithm and list the DETAILED calculation steps. A is the source. (15 points)

8. 请用 Dijkstra 路由算法制作最小费用路由表，并列出详细的计算步骤。a 是来源。(15 分)



9. Given that the bandwidth of a channel is 50Mb/s, and the end-to-end propagation delay is 1ms. The receiver window (rwnd) is 20,000 bytes and the sending maximum segment size (MSS) is 500 bytes. If the initial value of the congestion window (cwnd) is 1 MSS, the cwnd will reach the slow start threshold at the end of the 5th round. (12 points)

10. 假设信道带宽为 50Mb/s，端到端传播延迟为 1ms。接收窗口 (rwnd) 为 20,000 字节，发送最大数据段大小 (MSS) 为 500 字节。如果拥塞窗口 (cwnd) 的初始值为 1 MSS，cwnd 将在第 5 轮结束时达到慢启动阈值。(12 分)

(1) Please calculate the value of sending window in the 9th round and write down the detailed calculation process. (5 points)

(2) 请计算第 9 轮发送窗口的值，并写下详细的计算过程。(5 分)

(3) Please calculate the maximum throughput that can be achieved by the system. (4 points)

(4) 请计算系统可以达到的最大吞吐量。(4 分)

(5) Please calculate the channel utilization rate. (3 points)

(6) 请计算渠道利用率。(3 分)

11. In the following network topology, DNSServer provides domain name resolution service and HTTPServer provides Web service. The main physical ports of networks and the corresponding IP addresses are shown in the figure. (14 points)

12. 在下面的网络拓扑中，DNSServer 提供域名解析服务，HTTPServer 提供 Web 服务。网络的主要物理端口和相应的 IP 地址如图所示。(14 分)

(1) How many subnets are there in the topology? Please list the network address and subnet mask of each subnet. (3 points)

(2) 拓扑中有多少个子网？请列出每个子网的网络地址和子网掩码。(3 分)

(3) If the network between routers runs RIP protocol, please list the routing table when R0 is just started and that of R0 after exchanging routing information between routers. The header of the routing table should include destination network address, subnet mask, distance, and next-hop address. (6 points)

(4) 如果路由器之间的网络运行 RIP 协议，请列出 R0 刚启动时的路由表和 R0 在路由器之间交换路由信息后的路由表。路由表的报头应该包括目的网络地址、子网掩码、距离和下一跳地址。(6 分)

(5) How many times does the ARP protocol need to be run when PC1 communicates with PC2? (2 point)

(6) PC1 与 PC2 通信时，ARP 协议需要运行多少次？(2 分)

(7) If the domain name of HTTPServer is [www.jg.com](http://www.jg.com), please explain the execution process of  
(8) 如果 HTTPServer 的域名是 [www.jg.com](http://www.jg.com), 请解释的执行过程

the host PC0 accessing <http://www.jg.com> through the browser (explain only the Application  
主机 PC0 正在访问 <http://www.jg.com> 通过浏览器 (仅解释应用程序

Layer process). (3 points)

层过程)。(3 分)

