

### **Question I: Put (T or F)**

1. Coaxial cables transfer data much faster than fiber-optic cables.
2. In circuit switching, data are sent through the network in discrete chunks.
3. In packet switching, network resources are shared among users.
4. A process is uniquely identified by the IP address.
5. DHT is used to reduce time searching for information in a database.
6. DNS uses distributed database to store mapping information.
7. FTP uses UDP on ports 20,21.
8. ACKs are used to detect bit errors in the data
9. 3 Duplicate acks retransmits slower than timeout
10. Tunneling is used to achieve IPv4/IPv6 compatibility
11. IPv6 uses fragmentation when the datagram size exceeds MTU
12. VC network provides network-layer connection service
13. In Internet all links employ the same MAC protocol
14. Link layer protocols are implemented in the network adapter
15. Link layer protocols are called medium access control protocols

### **Question II: Fill in the spaces with the correct word(s)**

1. Wi-Fi uses ..... protocol.
2. TCP is used by most network applications such as .....
3. ....is the time for which a packet waits in the router' buffer to be transmitted onto the outbound link.
4. ....defines how messages are passed between sending mail servers and receiving mail server.
5. .... is a network entity that satisfies HTTP client request without involving original server.
6. .... is a method for file distribution in P2P architecture.
7. Checksum field in transport layer segment is used for .....
8. Host A sends segment of seq # 20 and data length 60 bytes to host B using TCP. When segment is received, host B will send ACK number equals .....
9. At the sender, TCP protocol stores application data in .....
10. .... is used to dynamically create IP addresses for the hosts in the Internet
11. .... is used to convert local IP addresses of a subnet into one IP address
12. The network layer relies on ..... to provide services
13. MAC address is represented in ..... notation
14. Link layer packet is called .....
15. In TDMA, each node is assigned ..... bandwidth

### **Question III: Choose the correct answer in each of the following**

1. **Packet switching uses**
  - a. TDM
  - b. FDM
  - c. Statistical Multiplexing
  - d. A combination of A and B
  - e. All of the above
2. **A communication protocol defines**
  - a. Message format
  - b. Message order
  - c. Actions based on received messages
  - d. Actions based on transmitted messages
  - e. All of the above

3. Which of the following is NOT correct about FTTH
- a. Uses a twisted pair cable from splitter to home
  - b. Uses a twisted pair cable from central office to home
  - c. Uses three types of technology Active, Passive and hybrid
  - d. Can't be used to carry TV signal
  - e. All of the above
4. Which of the following is NOT correct about HTTP
- a. Stateless
  - b. Use port 90
  - c. In-band
  - d. Connection-oriented
  - e. None of the above
5. Which of the following is NOT an elastic network application
- a. File transfer
  - b. Interactive games
  - c. Instant messaging
  - d. Video clips
  - e. b and d
6. Which of the following is NOT a DNS service
- a. Hostname to IP address translation
  - b. host aliasing
  - c. IP address to MAC translation
  - d. Load distribution
  - e. b and c
7. Which of the following is NOT true about TCP
- a. Best effort transfer
  - b. Flow control
  - c. Congestion control
  - d. Connection oriented
  - e. None of the above
8. The header length in UDP and TCP segments is \_\_\_\_\_ respectively
- a. 64 B, 10 B
  - b. 64 b, 20 B
  - c. 4 B, 8 B
  - d. 4 b, 30 B
  - e. None of the above
9. In non-persistent http, requesting 2 objects from the server costs us
- a.  $3RTT + 2$  transmission times
  - b.  $3RTT + 3$  transmission times
  - c.  $4RTT + 3$  transmission times
  - d.  $4RTT + 4$  transmission times
  - e.  $4RTT + 2$  transmission times
10. In IPv4, the datagram header is \_\_\_\_\_ long and the IP address is \_\_\_\_\_ long
- a. 20 byte, 32 bit
  - b. 32 byte, 32 bit
  - c. 16 byte, 128 bit
  - d. 40 byte, 64 bit
  - e. 8 byte, 16 bit

11. Which of the following is NOT correct about slotted ALOHA
  - a. Channel used for useful transmissions 37% of time
  - b. 37% of slots go empty
  - c. 26% of slots have collision
  - d. single active node can fully utilize channel
  - e. None of the above
12. If the datagram before fragmentation was: length = 4000 byte, ID = 7, and MTU is 1500 byte. What will be the data of the First fragment?
  - a. Length = 1480, ID = 7, Fragflag = 0, offset = 0
  - b. Length = 1500, ID = 7, Fragflag = 1, offset = 0
  - c. Length = 1500, ID = 7, Fragflag = 1, offset = 185
  - d. Length = 1480, ID = 7, Fragflag = 0, offset = 1
  - e. Length = 1480, ID = 7, Fragflag = 1, offset = 0
13. In an IP header, the 16-bit identifier is used for
  - a. Identifying the sending host
  - b. Identifying the receiving host
  - c. Identifying the receiving port
  - d. Reassembly of a fragmented packet
  - e. None of the above
14. Which of the following is NOT correct about subnets
  - a. All hosts can be reached without a router in a subnet
  - b. All hosts share the least significant n bits
  - c. All hosts share the most significant n bits
  - d. Can be visualized by detaching all interfaces from hosts and routers
  - e. None of the above
15. The biggest advantage of SR over GBN is
  - a. SR sends individual packets
  - b. SR has simpler design
  - c. SR has better channel utilization
  - d. SR has only one timer
  - e. None of the above

**Question IV: Compare between**

1. HTTP, FTP, and SMTP
2. Client-server and P2P

**Question V: problems**

1. In a circuit switching network, the following information are given: Link capacity = 10 Mbps, time to establish a circuit = 0.25 sec, TDM with 5 slot/sec is used. How long does it take to transmit a file of size 500KB on the circuit?
2. Data is transmitted from node A to node B on a route of three identical links with the following setup: Packet size = 8500bits, Transmission rate = 2Mbps, link length = 3500 Km, Signal speed = 270000 Km/s. Find its transmission delay, propagation delay and end-to-end delay.
3. Suppose that a web page consists of a base HTML file and 5 JPEG images, and that all objects reside on the same server. If RTT = 2 msec and file transmission time is 1 sec, compute the total time required to transfer this web page in the case of Non-persistent connection with pipelining.