Question Bank

COMPUTER NETWORKS

Short answer type questions.

UNIT – I

1. **What are the three criteria necessary for an effective and efficient networks?**

   The most important criteria are performance, reliability and security.
   <u>Performance</u> of the network depends on number of users, type of transmission medium, and the capabilities of the connected h/w and the efficiency of the s/w.
   <u>Reliability</u> is measured by frequency of failure, the time it takes a link to recover from the failure and the network's robustness in a catastrophe.
   <u>Security</u> issues include protecting data from unauthorized access and viruses.

2. **Group the OSI layers by function?**

   The seven layers of the OSI model belonging to three subgroups.
   Physical, data link and network layers are the *network support layers*; they deal with the physical aspects of moving data from one device to another.
   Session, presentation and application layers are the *user support layers*; they allow interoperability among unrelated software systems.
   The transport layer ensures *end-to-end reliable data transmission*.

3. **What are header and trailers and how do they get added and removed?**

   Each layer in the sending machine adds its own information to the message it receives from the layer just above it and passes the whole package to the layer just below it. This information is added in the form of headers or trailers. Headers are added to the message at the layers 6,5,4,3 and 2. A trailer is added at layer 2. At the receiving machine, the headers or trailers attached to the data unit at the corresponding sending layers are removed, and actions appropriate to that layer are taken.

4. **What are the features provided by layering?**

   Two nice features :
   - It decomposes the problem of building a network into more manageable components.
   - It provides a more modular design.

5. **Why are protocols needed?**

In networks, communication occurs between the entities in different systems. Two entities cannot just send bit streams to each other and expect to be understood. For communication, the entities must agree on a protocol. A protocol is a set of rules that govern data communication.

6. **What are the two interfaces provided by protocols?**

- Service interface
- Peer interface

<u>Service interface</u> – defines the operations that local objects can perform on the protocol.
<u>Peer interface</u> – defines the form and meaning of messages exchanged between protocol peers to implement the communication service.

7. **Mention the different physical media?**

- Twisted pair (the wire that your phone connects to)
- Coaxial cable (the wire that your TV connects to)
- Optical fiber (the medium most commonly used for high-bandwidth, long-distance links)
- Space (the stuff that radio waves, microwaves and infra red beams propagate through)

8. **Explain the two types of duplex?**

- *Full duplex* – two bit streams can be simultaneously transmitted over the links at the same time, one going in each direction.
- *Half duplex* – it supports data flowing in only one direction at a time.

9. **What is CODEC?**

A device that encodes analog voice into a digital ISDN link is called a CODEC, for *coder / decoder.*

10. **What are the different encoding techniques?**

- NRZ
- NRZI
- Manchester
- 4B / 5B

11. **What are the responsibilities of data link layer?**

Specific responsibilities of data link layer include the following :

a) Framing
b) Physical addressing
c) Flow control
d) Error control
e) Access control

12. **What are the ways to address the framing problem?**

- Byte-Oriented Protocols (PPP)
- Bit-Oriented Protocols (HDLC)
- Clock-Based Framing (SONET)

13. **Distinguish between peer-to-peer relationship and a primary-secondary relationship?**

All the devices share the link equally.
Primary-secondary relationship : One device controls traffic and the others must transmit through it.

14. **Mention the types of errors and define the terms?**

There are two types of errors

- Single-bit error
- Burst-bit error

Single bit error : The term single bit error means that only one bit of a given data unit (such as byte character / data unit or packet) is changed from 1 to 0 or from 0 to 1.
Burst error : Means that 2 or more bits in the data unit have changed from 1 to 0 from 0 to 1.

15. **List out the available detection methods.**

There are 4 types of redundancy checks are used in data communication.

- Vertical redundancy checks (VRC).
- Longitudinal redundancy checks (LRC).
- Cyclic redundancy checks (CRC).
- Checksum.

16. Write short notes on VRC.

The most common and least expensive mechanism for error detection is the vertical redundancy check (VRC) often called a parity check. In this technique a redundant bit called a parity bit, is appended to every data unit so, that the total number of 0's in the unit (including the parity bit) becomes even.

17. Write short notes on LRC.

In longitudinal redundancy check (LRC), a block of bits is divided into rows and a redundant row of bits is added to the whole block.

18. Write short notes on CRC.

The third and most powerful of the redundancy checking techniques is the cyclic redundancy checks (CRC). CRC is based on binary division. Here a sequence of redundant bits, called the CRC remainder is appended to the end of data unit.

19. Write short notes on CRC checker.

A CRC checker functions exactly like a generator. After receiving the data appended with the CRC it does the same modulo-2 division. If the remainder is all 0's the CRC is dropped and the data accepted. Otherwise, the received stream of bits is discarded and the dates are resent.

20. Define checksum.

The error detection method used by the higher layer protocol is called checksum. Checksum is based on the concept of redundancy.

21. What are the steps followed in checksum generator?

The sender follows these steps –
a) The units are divided into k sections each of n bits.
b) All sections are added together using 2's complement to get the sum.
c) The sum is complemented and become the checksum.
d) The checksum is sent with the data.

22. Mention the types of error correcting methods.

There are 2 error-correcting methods –
 • Single bit error correction
 • Burst error correction

23. Write short notes on error correction?

It is the mechanism to correct the errors and it can be handled in 2 ways :

- When an error is discovered, the receiver can have the sender retransmit the entire data unit.
- A receiver can use an error correcting coder, which automatically corrects certain errors.

24. What is the purpose of hamming code?

A hamming code can be designed to correct burst errors of certain lengths. So the simple strategy used by the hamming code to correct single bit errors must be redesigned to be applicable for multiple bit correction.

25. What is redundancy?

It is the error detecting mechanism, which means a shorter group of bits or extra bits may be appended at the destination of each unit.

26. Define flow control?

Flow control refers to a set of procedures used to restrict the amount of data. The sender can send before waiting for acknowledgement.

27. Mention the categories of flow control?

There are 2 methods have been developed to control flow of data across communication links –
a) Stop and wait – send one from at a time
b) Sliding window – send several frames at a time

28. What is a buffer?

Each receiving device has a block of memory called a buffer, reserved for storing incoming data until they are processed.