

Wasim-ur-Rahman

14524

BS (E) 4

## COMPUTER COMMUNICATION AND NETWORKS

### SESSIONAL ASSIGNMENT

Question no 1 answer :-

Services provided by the data link layer are following:-

- Reliable Delivery -
- Flow Control -
- Error Detection -
- Error Correction -
- Framing and link access -
- Half-Duplex and full-Duplex -

Question no 2 answer :-

Byte-oriented and bit-oriented protocol :-  
 → Bit oriented protocol are typically used in hardware where bandwidth is an important consideration. This will allow tighter packing of data.

- ~~Bit~~ Byte Oriented protocol are typically used in software as it is easy to process them. This will be losing packing of data.

(2)

compare to bit oriented protocol -

Byte stuffing and bit stuffing -

- Byte-stuffing adds an extra character to the data section of the frames to escape the flag-like pattern -
- Bit-stuffing adds an extra bit to the data section of the frame whenever a sequence of bits is similar to the flag -

Flow control and error control

- Flow control refers to a set of procedures used to restrict the amount of data that the sender can send before waiting for acknowledgment
- Error control refers to a set of procedures used to detect and correct errors.

HDLC and PPP :-

- HDLC is the bit oriented protocol while PPP is the character-oriented protocol -
- The HDLC and PPP are the ~~an~~ essential data link layer protocols used in WAN, where the HDLC can also be implemented with PPP for the efficient results -



Go-Back-N ARQ protocols and  
Selective-Repeat-ARQ protocol :-

→ In Go-Back-N ARQ protocol we  
can send several frames  
before receiving acknowledgment

→ In Selective-Repeat ARQ protocol  
we avoid unnecessary transmission

→ Both using sliding windows

Circuit-Switched network and  
packet switched network -

→ Circuit Switching is the connection  
oriented that means a path is  
established between source and  
destination before the transmission  
occurs - Packet Switching is connectionless  
that means a dynamic route is  
decided for each packet while  
transmission -

Space-division and time division  
Switches :-

→ In time division switch, the  
inputs are divided in time  
using TDM. A ~~gate~~ control unit  
Sends the input to the  
correct output devices

→ In a space division switch  
the path from one device

to another is spatially separate from other paths the inputs and outputs are connected using a grid of electronic micro switches -

Question no 3 answer :-

Noiseless channels protocols :-

(a) Simplest protocol :- In Simplest protocol there is no flow control and error mechanism -

(b) stop and wait protocol :- That is simplest stop and wait - set transmission

Noisy channels :-

(a) stop and wait Automatic Repeat Request :- In a noisy communication channel if a frame is damaged in transit the receiver hardware detect this when it computes the check sum -

(b) Sequence numbers :- The protocol specifies that frames need to be numbered. This is done by using sequence number - A field is added to the data frame



to hold sequence number of that frame-

Question no 4 answer :-  
In reliable full-duplex data transmission, the technique of hooking up acknowledgments onto outgoing data frames is called piggybacking in HDLC.

Question 5 answer :-  
In multi-stage switching blocking refers to times when one or more input cannot be connected to an output because there is no path available between them all the possible intermediate switches are occupied.  
One solution to blocking is to increase the number of intermediate switches based on close criteria.

Question 6 answer

(a) Sender :- 0 1 2 3 | 4 5 6  
Window of PDU that may be transmitted  
Receiver :- 0 1 2 3 | 4 5 6

(b) A has shrunk its window as it has transmitted three PDU's but has received ack for 2 PDU's hence it is keeping copy of one PDU -  
0 1 | 2 3 4 5 6

Receiver :- 0 1 | 2 3 4 5 6

Receiver has received all data hence the window remains in 4 bit size -

(c) Sender :-  
0 1 2 3 4 | 5 6 7 0 1

Receiver :-  
Acknowledgment received for 2-bits

0 1 2 3 4 | 5 6 7 0 1

Question no 7 answer :-

3 Three techniques for digital to digital conversions are as following :-

- Line coding
- Block coding
- Scrambling -

Question no 8 :- answer

→ A data element is the smallest entity that can represent a piece of information (a bit)

→ A signal element is the shortest unit of a digital signal -

Question no 9 answer :-

Data rate :- Number of data elements transmitted per second -

Signal rate :- Number of signal elements transmitted per second -

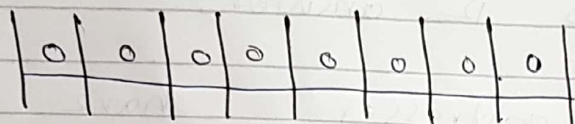


(7)

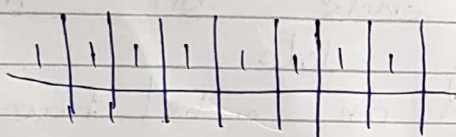
Question (10)

answer:-

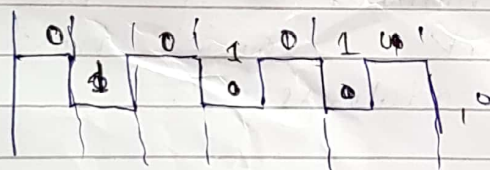
(A) 00000000



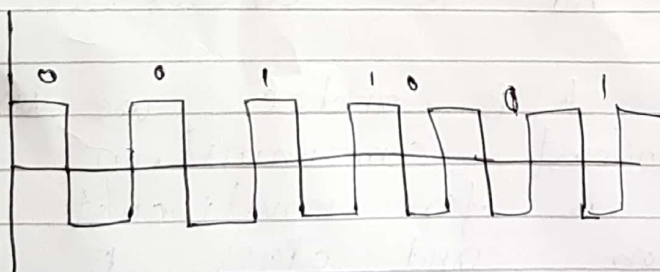
(b) 11111111



(c) 01010101



(d)



Question no (11)

answer :-

→ An IPv<sub>6</sub> address is 128 bits in length and consist of 8 16-bit fields - with each field bounded by a colon -

Each field must contain a hexa-decimal number - IPv<sub>4</sub> address is 32 bit long -

In contrast to the dotted decimal notation of IPv4 address -

Question no 12 answers:-

- All IP addresses have a network and host position
- In classful addressing, the network portion ends on one of the separating dots in the address (on an octet boundary) -
- classless addressing uses a variable number of bits for the network and host portions the address -

Question no 13 answer:-

- class A, B and C are used for unicast communication
- class D is for multi cast communication and class E addresses are reserved for special purposes -

Question 14 answer :-

A mask in classful addressing is used to find the first address in the block when one of the addresses is given.

- The Default mask refers to the mask when there is no subnetting or Supernetting



### Question 15 answer :-

- The network address in a block of addresses is used to find the first address.
- The mask can be ANDed with any address in the block to find the network address.

### Question 16 answer :-

- Many people like users and small business have created small networks with several host and they needed IP address for each host.
- ~~Created~~ Results into the shortages of address which created a serious problem.
- A solution to this problem is called network address translation (NAT).

- It enables users to have a large set of addresses internally and one address or a small set of addresses.

### Question 17 answer :-

- The address space in 16-bit address is :-  $2^6 = 65536$ .

Question no 18 answer :-

The bits are need to represent an address as following :-

$$2^8 = 1024 \rightarrow$$

$$n = \log_2 1024 = 10 -$$

Question no 19 answer :-

(a) 10000001 00001110 00000110  
 00001000

(b) 11010000 0100010 00110110  
 00001100

Question 20 answer

a) Ip address  $\Rightarrow$  01111111 11110000 01100111  
 01111101

$$\Rightarrow 127, 240, 103, 125 =$$

b) Ip address  $\Rightarrow$  10101111 11000000 11111000  
 00011101

$$\Rightarrow 175, 192, 240, 29$$



## Question 21 :-

→ With the information given in the questions the first address is found by ANDing the host address with the mask 255.255.0.0 (16)

Host address:- 25 . 34 . 12 . 56

Mask (ANDed):- 255 . 255 . 0 . 0

Network Address (First):- 25 . 34 . 0 . 0