

Roll No.:.....

# *National Institute of Technology, Delhi*

Name of the Examination: B.Tech.

Branch : ECE

Semester : 6th

Title of the Course : Computer Networks

Course Code :CSB 342

Time: 3 Hours

Maximum Marks: 50

Note :Make necessary assumptions wherever needed.

## Guidelines:

1. The question paper is divided into three sections A, B and C and each section has following type of questions
  - a. Section A: Contains 10 questions of 01 mark each and all parts are compulsory.
  - b. Section B: Contains Five (05) questions of 5 marks each and any four (04) are to be attempted.
  - c. Section C: Contains Three (03) questions of ten (10) marks each and any two (02) are to be attempted.

## Section – A

**All questions are compulsory in this section.**

1. Which one of the following protocol is not used in internet?  
a) HTTP      b) DHCP      c) DNS      d) None of the mentioned
2. If you want to find the number of routers between a source and destination, the utility to be used is.  
a) route      b) Ipconfig      c) Ifconfig      d) Traceroute
3. In segment header, sequence number and acknowledgement number field refers to  
a) Byte number      b) Buffer number      c) Segment number      d) Acknowledgment
4. Connection establishment in TCP is done by which mechanism?  
a) Flow control      b) Three-Way Handshaking      c) Forwarding      d) Synchronization
5. Beyond IP, TCP provides additional services such as
  - a) Routing and switching
  - b) Sending and receiving of packets
  - c) Multiplexing and demultiplexing
  - d) Demultiplexing and error checking
6. The main advantage of UDP is
  - a) More overload      b) Reliable      c) Less overload      d) Fast

7. In Go-Back-N window, when the timer of the packet times out, several packets have to be resent even some may have arrived safe. whereas in Selective Repeat window, tries to send \_\_\_\_\_
- Packet that have not lost
  - Packet that have lost or corrupted
  - Packet from starting
  - All the packets
8. To deliver a message to the correct application program running on a host, the \_\_\_\_\_ address must be consulted
- IP
  - MAC
  - Port
  - none of the mentioned
9. To deliver a message to the correct application program running on a host, the \_\_\_\_\_ address must be consulted
- IP
  - MAC
  - Port
  - none of the mentioned
10. This is a time-sensitive service
- File transfer
  - File download
  - E-mail
  - Internet telephony.

### **Section – B**

**(4x5 = 20 marks)**

**Question 1.** (A) Explain contention based method for channelization in detail. (3 +2 marks )

(B) . Station A needs to send a message consisting of 9 packets to Station B using a sliding window (window size 3) and go-back-n error control strategy. All packets are ready and immediately available for transmission. If every 5th packet that A transmits gets lost (but no acks from B ever get lost), then what is the number of packets that A will transmit for sending the message to B?

**Question 2.** (A ) The message 11001001 is to be transmitted using the CRC polynomial  $x^3+1$  to protect it from errors. The message that should be transmitted is..... (2 marks)

(B) What is Piggybacking? Explain its advantages in detail. (3 marks)

**Question 3.** (A) Explain how slotted aloha improves the performance of pure aloha. (2 marks).

(B) Consider an instance of TCP's Additive Increase Multiplicative Decrease (AIMD) algorithm where the window size at the start of the slow start phase is 2 MSS and the threshold at the start of the first transmission is 8 MSS. Assume that a timeout occurs during the fifth transmission. Find the congestion window size at the end of the tenth transmission. (3 marks)

**Question 4.(A )** While opening a TCPTCP connection, the initial sequence number is to be derived using a time-of-day (ToD) clock that keeps running even when the host is down. The low order 32 bits of the counter of the ToD clock is to be used for the initial sequence numbers. The clock counter increments once per milliseconds. The maximum packet lifetime is given to be 64s.

Which one of the choices given below is closest to the minimum permissible rate at which sequence numbers used for packets of a connection can increase?

- 1). 0.015/s                      2). 0.064/s                      3). 0.135/s                      ( 2 marks)

(B) Suppose that N ethernet stations, all trying to send at the same time, require  $N/2$  slot times to sort out who transmits next. Assuming the average packet size is 5 slot times, express the utilization of ethernet as a function of N..... (3 marks)

### Section – C

(10\*2 =20 marks )

**Question 1 . (A)** With a suitable example explain Distance Vector Routing algorithm. What is the serious drawback of Distance Vector Routing algorithm? Explain. ( 5 marks )

(B) Suppose each station in IEEE 802.5 with 1bit delay is 48m apart from its neighboring stations. Token is of 3 Bytes and propagation speed is  $2.4 \times 10^8$  m/sec.

To avoid overlapping in the 4Mbps token ring the monitor must insert 15 bits of artificial delay into ring. How many stations are there in the ring? (2 marks).

(c ) An Internet Service Provider (ISP) has the following chunk of CIDR-based IP addresses available with it: 245.248.128.0/20. The ISP wants to give half of this chunk of addresses to Organization A, and a quarter to Organization B, while retaining the remaining with itself. Find valid allocation range of addresses to A and B? (3 marks).

**Question 2. (A)** Explain OSI layer and functioning of all its layer in detail . ( 5 marks )

(B). ) The distance between two stations M and N is L kilometers. All frames are K bits long. The propagation delay per kilometer is t seconds. Let R bits/second be the channel capacity. Assuming that processing delay is negligible, So find the minimum number of bits for the sequence number field in a frame for maximum utilization, when the sliding window protocols used ? ( 3 marks )

(c ) C) Explain the following in detail.

- (1) Mesh Topology      (2) Vulnerable period                      ( 2 marks)