C7-R3: ADVANCED COMPUTER NETWORKS

NOTE:

1. **Answer question 1 and any FOUR questions from 2 to 7.**
2. **Parts of the same question should be answered together and in the same sequence.**

Time: 3 Hours **Total Marks: 100**

1.

a) Explain the process of HDB3 coding. For what purpose it is used.

b) What are the salient features of ATM? Give the schematic diagram of ATM header field and explain its various fields.

c) Imagine a switch with only one input and one output interface. If data rate at output interface is 1.544 Mbps and the input data is bursty with a rate of 40 Mbps for duration of 100ms. What should be the size of queue so that the data packets are not lost?

d) Discuss the process of HTTP transaction. List various messages associated with it.

e) Let $g(D) = D^4 + D^2 + D + 1$ and let $s(D) = D^3 + D + 1$, find the remainder when $D^4 s(D)$ is divided by g(D) using modulo 2 arithmetic.

f) What is the purpose of framing in the context of point to point protocols? What is the meaning of STX and ETX SYN in the context of character based framing.

g) Define the following in the context of "Fibre Distribution Data Interface".
   i) TTRT
   ii) SA
   iii) TRT
   iv) THT

(7x4)

2.

a) How is tree algorithm different from FCFS splitting algorithm? Explain the functioning of "tree algorithm" with the help of suitable diagram.

b) Show that ñ, the expected number of packets successfully transmitted in CRR splitting algorithm is given by.

$$\tilde{n} = 1 - e^{-G_0} + \Sigma \text{ (for i = 1, infinity) } p(R,i)$$

Assume the initial allocation interval is α_0, with $G_0 = \alpha_0 \lambda$

(9+9)

3.

a) Customer arrives at a fast food restaurant at the rate of 5 per minute and waits to receive their order for an average of 5 minutes. Customers eat in the restaurant with a probability 0.5 and carry out their order without eating with a probability on 0.5. A meal requires an average of 20 minutes. What is the average number of customers in the restaurant?

b) Derive the equations for average waiting time and average delay per customer in nonpreemptive priority queuing in M/G/1 system.

(9+9)

4.

a) Explain the functioning of IEEE 802.6 DQDB. With the help of diagram explain, how data transmission takes place in DQDB.

b) Imagine the length of the ring in a token ring is 1000 meters. If the speed of propagation in a twisted pair cable is 60% of the speed of light, how long does it take for a bit to make a complete trip?

c) Differentiate between circuit switching, packet switching and message switching.

(6+6+6)

5.

a) Explain following subscriber access methods to the ISDN.
   i) B channel
   ii) D channel
   iii) H channel

b) List various ISDN layers. Differentiate between transformational and derivational analogy in context of learning. What are various activities performed by each layer?

c) Explain, what is meant by LAPD addressing? Sketch LAPD address field diagram and explain its various fields.

(6+6+6)

6.

a) By providing a flow chart explains the functioning of the leaky bucket algorithm. For what purpose is it used?

b) With a diagram, explain the working of Banyan switch. Show the route connections of banyan switch for the following:
   i) Input 1 sending a cell to the output 6.
   ii) Input 5 sending cell to the output 2.

(9+9)

7.

a) Define following attributes in context of ATM:
   i) CLR
   ii) CTD
   iii) CDV
   iv) CER

b) Discuss distance vector routing. Discuss, how information is updated in routing table.

(8+10)