

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) "Departure process in M/M/1 queues is Poisson" comment.
 - b) Under what condition a slotted ALOHA becomes bi-stable?
 - c) What are the functions of transmission convergence layer in ATM?
 - d) How are packet mode and isochronous data accommodated in FDDI-II?
 - e) Show the functional grouping and User-Network Interfaces in ISDN.
 - f) How are URG and PSH flags used in TCP protocol?
 - g) Is the following table realizable for a finite buffer state-independent M/M/1 system? Why or why not?

n	0	1	2	3	≥ 4
p(n)	0.4	0.3	0.2	0.1	0.0

(7x4)

2.
 - a) What is the Little's formula? Show that the Little's formula is valid for queues with Markovian arrivals and any General Service time distribution.
 - b) In a computer network the queuing discipline is M/G/1. The average packet arrival rate is 4 packets/sec and packet lengths are uniformly distributed between 500 and 2500 bits. The service rate is 15 kb/s. What is the probability that the server is not busy?

(9+9)

3.
 - a) Explain CBR, ABR and UBR services using appropriate examples.
 - b) Depict a combined VC-VP switch in ATM.
 - c) Using a diagram, discuss Virtual Scheduling Algorithm to check cell delay variation tolerance.

(6+6+6)

4.
 - a) A collision resolution algorithm uses splitting. The feedback sequence is e,e,1,e,0,e,1,1,0 (e : collision; 0 : Idle; 1 : Success). Show the splitting tree and explain the splitting process.
 - b) What are the key differences between FDDI and IEEE 802.5 (Token Ring) protocols? How is the value of TTRT selected in FDDI?

(9+9)

5.
 - a) Discuss the operation of OSPF interior gateway protocol.
 - b) What are the enhancements in IPv6 over IPv4? What is the use of flow label in IPv6 header?

(10+8)

6.

- a) How is the problem of duplicate CONNECTION REQUEST/duplicate ACK solved in TCP? Illustrate using appropriate diagrams?
- b) A TCP circuit uses window size of $2^{16}-1$. It operates at 100 Mbps with one-way propagation delay of 10 ms. Calculate the normalized throughput. Neglect other TCP overheads.

(8+10)

7.

- a) How does SMTP use relay agents for Internet E-Mail?
- b) Why are both virtual circuit and virtual paths provided in ATM?
- c) Discuss the operation of Distributed Queue Dual Bus (DQDB) protocol. Why is this protocol unfair?

(6+6+6)