

C2-R4: ADVANCED COMPUTER NETWORKS

NOTE:

1. Answer question 1 and any FOUR from questions 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) Asynchronous Transfer Mode (ATM) is, according to the ATM Forum, a Telecommunications concept defined by ANSI and ITU. What are the types of service provided by ATM?
 - b) According to IP's Integrated Service Architecture (ISA), how ISA applications can be divided?
 - c) IPv4 is a protocol which works at Network layer. What are the limitations of IPv4?
 - d) Multicast is the delivery of a message or information to a group of destination computers simultaneously in a single transmission from the source. What are the steps for joining Multicast Group?
 - e) The Real-Time Streaming Protocol (RTSP) establishes and controls either a single or several time-synchronized streams of continuous media such as audio and video. How does it differ from normal http behavior?
 - f) Write the differences between Classical Aloha and Slotted Aloha.
 - g) Remote Procedure Call (RPC) is an inter-process communication that allows a computer program to call a subroutine or procedure which executes in another address space. List the sequence of events during RPC.

(7x4)

2.
 - a) What is purpose of Closed Jackson network? State and prove Closed Jackson network theorem.
 - b) An ATM cell header can be one of two formats: UNI or the NNI. The UNI header is used for communication between ATM endpoints and ATM switches in private ATM networks. The NNI header is used for communication between ATM switches. Write and explain fields of UNI and NNI frame format.

(10+8)

3.
 - a) In ATM, Connection Admission Control is the set of actions taken by the network during the call set-up phase to establish virtual path or virtual channel. How does it perform traffic control procedure, network resource management and connection admission control mechanism?
 - b) Multicast (point-to-multipoint) is a communication pattern in which a source sends a message to a group of destinations. Explain in brief Multicast Routing algorithms: Spanning Tress, Reverse Path Broadcasting and Truncated Reverse Path Broadcasting.

(9+9)

4.
 - a) What are the responsibilities of ATM Physical layer?
 - b) IPv6 (Internet Protocol version 6) is the latest revision of the Internet Protocol (IP). Write down the features of IPv6.
 - c) M/G/1 queue is a queue model where arrivals are random (modulated by a Poisson process), service times have a General distribution and there is a single server. Derive formula for the *Pollaczek-Khinchin* mean value.

(4+6+8)

5.

- a) In telecommunications and computer networks, multiplexing is a method by which multiple analog signals or digital data streams are combined into one signal. What are the types of it?
- b) What are the advantages of layered architecture of network?
- c) TCP is connection oriented protocol which establishes connection before data transmission. Explain steps of TCP three way handshakes.

(6+6+6)

6.

- a) What are the services provided by ATM AAL3/4?
- b) Random early detection (RED), also known as random early discard or random early drop, is an active queue management algorithm. Draw and explain flow chart of RED.
- c) TCP is a transport layer protocol. Write and explain TCP Header Format.

(4+7+7)

7.

- a) How are data passed through one network to another network in ATM network using virtual path and virtual channel?
- b) IPv6, like the most commonly used IPv4, is an Internet-layer protocol for packet-switched internetworking and provides end-to-end datagram transmission across multiple IP networks. Write and explain IPv6 Extension Header format.
- c) Protocol-Independent Multicast (PIM) is a family of multicast routing protocols for Internet Protocol (IP) networks. Write down variants of PIM and explain any two in detail.

(6+6+6)