

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) Justify: VoIP uses UDP protocol to transfer voice over internet, although UDP provides connectionless service.
- b) Differentiate between ALOHA and CSMA technique with respect to medium access.
- c) Define Terms Virtual Path and Virtual Channel.
- d) What are the limitations of current IP network?
- e) TCP is connection oriented protocol. How does it establish connection during startup?
- f) M/G/1 queue is a queue model where packet arrivals follow Markovian theory, service times have a General distribution and there is a single server. Explain probability generating function of the stationary queue length in M/G/1.
- g) What are the differentiated services offered by IPv4 protocol header?

(7x4)**2.**

- a) In telecommunications and computer networks, what is a method by which multiple analog or digital signals are combined into one signal over a shared medium? By taking suitable diagram, explain types of multiplexing.
- b) Congestion avoidance is a preventive method of congestion control of network. Explain Jacobson's and Karn's algorithm of congestion avoidance.

(8+10)**3.**

- a) In queuing theory what is importance of Jackson Theorem?
- b) Transport layer provides connection oriented or connection less services to the applications. Differentiate connection oriented and connection less services.
- c) ALOHA is a system for coordinating and arbitrating access to a shared communication channel. How does Slotted ALOHA improve the efficiency of pure ALOHA?

(6+6+6)**4.**

- a) Asynchronous Transfer Mode (ATM) is "a telecommunications concept defined by ANSI and ITU (formerly CCITT) standards for carriage of a complete range of user traffic, including voice, data, and video signals". Write down the various services offered by ATM?
- b) IPv6 is advanced version of IPv4 which is developed to overcome limitations of IPv4 and also provide feature to support future networking. What are the features supported by IPv6 protocol?
- c) Congestion happens whenever the input rate is more than the available link capacity. How ATM does manage traffic Congestion Control?

(6+6+6)**5.**

- a) Weighted fair queuing (WFQ) is a data packet scheduling algorithm used by network schedulers. How does it work?
- b) Write short note on Multicast routing protocol.

(6+12)

- 6.**
- a) Multi-Protocol Label Switching (MPLS) is a standard technology that offers new capabilities for large scale IP networks. How does it function to offer new capabilities of large scale IP network?
 - b) Draw and explain functionality of each layer of ATM protocol stack.

(8+10)

- 7.**
- a) The User Datagram Protocol (UDP) is one of the core members of the Internet protocol suite. What are the attributes of UDP?
 - b) What is VPN? Why is it important for the organization which has multiple branches in different states?
 - c) The Spanning Tree Protocol (STP) is a network protocol that builds a logical loop-free topology for Ethernet networks. How does Rapid STP provide significantly faster spanning tree convergence compared to normal STP?

(6+6+6)