

## Internet and Web based Technology

Paper code: ICE 1002

Full Marks: 70

Branch: IT

Time: 3 hr

### Answer any FIVE questions

1.
  - a. What network architecture does UNIX follow? Describe with a suitable diagram. Is it layered architecture?  
If yes, how do user processes directly interact with lower layer protocols? (According to the layered architecture, layer  $i$  should not interact with layer  $(i-2)$ , and user process can take service only from Application layer.)  
If no, what type of architecture this is?
  - b. What do you understand by (☞) Socket address, (☞) Packet socket?
  - c. How do the programs, like *tracert* or *traceroute* find the route from source to destination? Briefly describe the steps.

5 + 4 + 5
2.
  - a. Can CSMA/CA completely avoid collision? If yes, describe how collision is avoided. If no, state when collision can occur.
  - b. What is the role of NAV (Network Allocation Vector) in wireless LAN?
  - c. Describe with help of suitable diagram how hidden station problem is solved in wireless LAN.
  - d. Propose a solution for exposed station problem in wireless LAN.
  - e. Determine the maximum length of the cable (in km) for transmitting data at a rate of 500 Mbps in an Ethernet LAN with frames of size 10,000 bits. Assume signal speed in the cable is 2, 00,000 km/s.

3 + 2 + 3 + 3 + 3
3.
  - a. A DQDB MAN has six stations A, B, C, D, E and F connected in that order. Three stations become ready to transmit and send requests in order of C, E and B. Construct the virtual queue table and explain how they are made to transmit in order.
  - b. Why don't we deal with routing technique (like distance-vector or link state routing) during the design of LAN and MAN? If you are asked to remove routing techniques from a WAN, what changes then are to be made in the specifications of the WAN?
  - c. Do we need routing technique (like distance-vector or link state routing) if the network is virtual-circuit switched network?

6 + 5 + 3
4.
  - a. What is split-horizon method to solve count-to-infinity problem? Give an example where split-horizon cannot solve count-to-infinity problem.

b. At which layer do the RIP and OSPF work? Write short notes on these two protocols.

c. What do you understand by Autonomous systems in Internet? Which technique is followed for the routing among the autonomous systems?

d. Assuming that all routers and hosts are working properly and that all software in both is free of all errors, is there any chance, however small, that a packet will be delivered to the wrong destination?

$$4 + (1 + 4) + 2 + 3$$

5. a. Discuss about the role of *Flow Label* field in IPv6 header.

b. Why is *Header Checksum*-like field of IPv4 absent in IPv6? What is the advantage of omitting such field?

c. In which situation DHCP is preferred over static IP address allocation? Discuss.

d. For real time multimedia applications (e.g. on-line match telecast), which transport layer protocol – TCP or UDP is preferred? Explain.

$$4 + 4 + 3 + 3$$

6. a. Traditionally, it is assumed that arrivals of packets in network follow Poisson distribution, that is, the packets are assumed as independent. However, recent experimentations with LAN and WAN traffic have challenged the commonly assumed models for network traffic. The traffic is practically self-similar in nature. What are the reasons, in your opinion, of such behavior of network traffic?

b. A system uses the Stop-and-Wait ARQ protocol. If each packet carries 1000 bits of data, how long does it take to send 1 million bits of data if the distance between the sender and receiver is 5000 km and the propagation speed is  $2 \times 10^8$  m/s? Ignore transmission, waiting and processing delays. Assume no data or control frame is lost or damaged.

c. Find the physical length of a bit in a 10-Mbps LAN. Signal propagation speed is  $2 \times 10^8$  m/s

d. A computer network generally uses two types of addresses (physical and logical) to deliver data to some specific host. Can you construct a computer network with a single type of address? If not, state reason. If yes, state the problems of doing so.

$$4 + 4 + 2 + 4$$

7. a. Describe the role of DNS and WWW to achieve transparency in Internet.

b. What types of code migration is possible in Internet?

c. How is openness achieved in Internet?

d. What are the challenges are faced by the Internet to qualify as a true distributed system?

$$5 + 2 + 2 + 5$$