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TCS–604

B. TECH. (CSE)

(SIXTH SEMESTER) END SEMESTER EXAMINATION, 2022

COMPUTER NETWORK—I

Time :Three Hours

Maximum Marks : 100

Note : (i) All questions are compulsory.

(ii) Answer any *two* sub-questions among (a), (b) and (c) in each main question.

(iii) Total marks in each main question are **twenty.**

(iv) Each question carries 10 marks.

1. (a) Explain TCP/IP protocol stack with diagram and proper functionality of each layer. (CO1)

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(b) Define the working functionality of the circuit and packet switching with the help of suitable diagram. (CO1)

(c) Consider two host A and B, connected by a single link of rate R bps. Suppose that the two hosts are separated by *m* meters, and suppose the propagation speed along the link is *s* meters/sec. Host A is to send a packet of size L bits to Host B. (CO1)

(i) Express the propagation delay, d_{prop}, in terms of *m* and *s*.

(ii) Determine the transmission time of the packet, d_{trans} in terms of L and R.

(iii) Suppose s= $2.5*10^8$, L=100 bits, and R=28 Kbps. Find the distance *m* so that d_{prop} equals d_{trans}.

2. (a) Explain the working of cookies, proxy server and conditional GET with the help of an example and suitable diagram. (CO2)

(b) Explain the Working functionality of the DNS with the help of a suitable diagram. (CO2)

(c) What are the different mail access protocols, explain the working of any *two* ? (CO2)

3. (a) What are the different services provided by the Transport layer ? Explain the difference between connection-oriented and less services. (CO3)

(b) Explain the working functionality of the TCP header segment with a suitable diagram. (CO3)

(c) Discuss the scenario for building a reliable data transfer protocol (RDT) for the Lossy channel with bit errors. (CO3)

4. (a) Assume that, in a Stop-and-Wait system, the bandwidth of the line is 1 Mbps, and 1 bit takes 20 milliseconds to make a round trip. (CO4)

(i) What is the bandwidth-delay product ? If the system data packets are 1,000 bits in length, what is the utilization percentage of the link ?

(ii) What is the utilization percentage of the link, if we have a protocol that can send up to 15 packets before stopping and worrying about the acknowledgements ?

(b) Explain the Connection Establishment concept of TCP with a suitable diagram. (CO4)

(c) Explain the working functionality of the following : (CO4)

(i) Stop-and-wait

(ii) Go Back N

(iii) Selective Repeat

5. (a) Explain IP datagram Header format with suitable diagram and functionality. (CO5)

(b) State the importance and advantages of using subnetting in ipv4. Consider you have a network having IP Address 192.168.10.0. You have to perform subnetting and divide the entire network into 4 subnets. Then find out the total number of subnets possible, the subnet id, Maximum number of IP per subnet, Range of IP Addresses, and Broadcast Address for each subnet. (CO5)

(c) Explain the working functionality of the following : (CO5)

(i) DHCP

(ii) Network Address Translation (NAT)

(iii) Internet Control Message Protocol (ICMP)

(iv) IP Security in IPV4