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TCS–604

B. TECH. (CSE) (SIXTH SEMESTER)
END SEMESTER
EXAMINATION, June, 2023

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 sub-question carries 10 marks.

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

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

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(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 in meters/sec. Host A is to send a packet of size L bits to Host B.

(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}. (CO1)

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

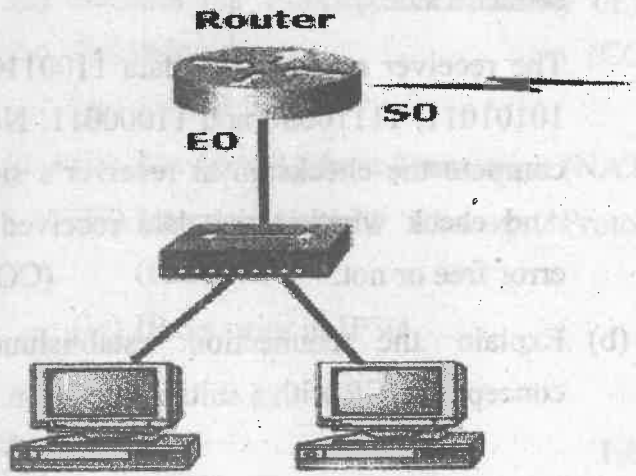
(b) Explain the working functionality of the DNS with the help of a suitable diagram. (CO2)

(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) (i) Using the following illustration, what would be the IP address of E0 if you were using the eighth subnet ? The network ID is 192.168.10.0/28 and you need to use the last available IP address in the range. The zero subnet should not be considered valid for this question.



(ii) Using the illustration from the previous question, what would be the IP address of S0 if you were using the first subnet ? The network ID is 192.168.10.0/28 and you need to use the last available IP address in the range. Again, the zero subnet should not be considered valid for this question. (CO3)

4. (a) A sender wants to send 4 frames each of 8 bits to a receiver, where the frames are 11001100, 10101010, 11110000 and 11000011. Compute the checksum at sender's side.

The receiver receives the data 11001100, 10101011, 11110000 and 11000011. Now compute the checksum at receiver's side. And check whether the data received is error free or not. (CO4)

(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) (i) Suppose, we have a big single network having IP address 200.1.2.0. Divide this network into 4 subnets.

(ii) What is the subnetwork address for a host with the IP address 200.10.5.68/28 ? (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