Term Evaluation (Odd) Semester Examination September 2025

Roll no.....

Name of the Course and semester: **B. Tech Computer Science and Engineering Vth semester**
Name of the Paper: **Computer Networks I**
Paper Code: **TCS-514**
Time: 1.5 hour Maximum Marks: 50

Note:
(i) Answer all the questions by choosing any one of the sub questions
(ii) Each question carries 10 marks.
(iii) Please specify COs against each question.

Q1. (10 Marks)

a. Discuss the TCP/IP Protocol Stack and how it facilitates data communication using all the layers present in it at the network edge and core. (CO 2)

OR

b. Consider a message that is $10x10^6$ bits long, that is to be sent from source to destination (connected via 3 routers and assume links are uncongested), the transmission rate of all the links present in between is 4Mbps each, how long does it take to move the complete file from source to destination using message segmentation with each packet size 10000 bits long (disregard processing and propagation delay)? (CO 1 and 2)

Q2. (10 Marks)

a. What is **DNS**? Describe how the **Domain Name System** resolves domain names to IP addresses using both the approaches and DNS data base hierarchy. (CO 2)

OR

b. Compare the two application architectures and discuss the efficiency of each method based on the calculated distribution times of a particular file. (assume data if required to explain) (C0 3)

Q3. (10 Marks)

a. Explain the **HTTP protocol** with a focus on **persistent** and **non-persistent connections**. Which type is more efficient for modern web traffic and also explain Conditional GET method used by HTTP using a scenario? (CO 3)

OR

b. Define Packet Switching and explain how it works. Compare it with Circuit Switching and provide examples of where each is used. (CO 2 and 3)

Q4. (10 Marks)

a. Describe the **peer-to-peer (P2P) architecture** used by BitTorrent and how it differs from traditional client-server models and also explain how a newly joined peer gets its first chunk. (CO 3)

OR

b. Explain the architecture of electronic mail application and Compare **POP3** and **IMAP** protocols. In

what scenarios would you prefer using one over the other for email management? (CO 2 and 3)

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5. CO1

a) How long does it take a packet of length 1,000 bytes to propagate over a link of distance 2,500 km, propagation speed 2.5 x 10^8 m/s, and transmission rate 2 Mbps? More generally, how long does it take a packet of length L to propagate over a link of distance d, propagation speed s, and transmission rate R bps? Does this delay depend on packet length? Does this delay depend on transmission rate?

OR

b) Match the following to one or more layers of the OSI model:

- Reliable process-to-process message delivery
- Route selection
- Defines frames
- Provides user services such as e-mail and file transfer
- Transmission of bit stream across physical medium