Graphic Era
HILL UNIVERSITY
Established by an Act of the State Legislature of Uttarakhand (Adhiniyam Sankhya 12 of 2011)
University under section 2(f) of UGC Act, 1956

Term Evaluation (Even) Semester Examination March 2025

Roll no. 2294038

Name of the Course and semester: B.Tech (CSE Core) & VI Semester
Name of the Paper: Computer Networks I
Paper Code: TCS 604

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. Explain the TCP/IP model in detail, including its layers, functionalities, and comparison with the OSI model.

OR

b. A telephone circuit-switching system has a call setup time of 3 seconds. Once the circuit is established, a 5 MB file is transmitted over a 1 Mbps link. The propagation delay of the link is 40 ms. Calculate the total time required to send the file.

Q2.   (10 Marks)

a. A 2 GB file is sent over a 250 Mbps link. The network has 3 routers (4 links total), and the propagation delay per link is 20 ms. Compare total delay in two scenarios:
    i. No segmentation
    ii. Segmentation into 100 MB packets

OR

b. A user enters "www.cousera.com" into their browser. Explain step by step how an iterative query process would resolve this domain.

Q3.   (10 Marks)
a. How do POP (Post Office Protocol) and IMAP (Internet Message Access Protocol) interact with SMTP in retrieving emails?

OR

b. How does MIME extend SMTP to support attachments, multimedia content, and different character encodings?

Q4.   (10 Marks)
a. A new peer joins a BitTorrent swarm with no uploaded data. How does it get unchoked by other peers?

OR

b. Consider a Scenario Where a Web Page Contains 10 Embedded Objects (Images, CSS, JS, etc.).

- How many TCP connections are required if the client uses Non-Persistent HTTP?
- How does this number change if Persistent HTTP is used?
- Calculate the total delay in both cases, considering TCP handshake time and object transfer time.

Q5.   (10 Marks)
a. What are the key components of a DNS tuple (e.g., Name, Type, Class, TTL, Data)?

Mid Term (Even) Semester Examination March 2025

OR

b. A 35 GB software update needs to be sent to various clients. The server has a 1 Gbps upload link, while each client can download at 10 Mbps and upload at 500 Kbps, 2 Mbps, or 8 Mbps.

For N = 100, 1000, and 10000, compute:
i. The total distribution time for client-server
ii. The total distribution time for P2P