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

End Term (Even) Semester Examination May-June 2025

Roll no.....

Name of the Program and semester: B.Tech (CSE) 6th Sem
Name of the Course: Computer Networks-I
Course Code: TCS- 604

Time: 3 hour | Maximum Marks: 100

Note:

(i) All the questions are compulsory.
(ii) Answer any two sub questions from a, b and c in each main question.
(iii) Total marks for each question is 20 (twenty).
(iv) Each sub-question carries 10 marks.

Q1. (2X10=20 Marks)

a. Analyze the impact of propagation delay in satellite communication. What layer is affected the most and why? (CO1)
b. A packet of 1000 bytes is sent on a 10 Mbps link with 100ms propagation delay. Calculate the total delay. (CO1)
c. Discuss the lifecycle of an email using SMTP and POP3 or IMAP protocols. (CO2)

Q2. (2X10=20 Marks)

a. Analyze how BitTorrent's use of parallel downloads increases performance compared to traditional FTP. (CO2)
b. A DNS resolver queries 3 servers sequentially with RTTs of 60 ms, 30 ms, and 10 ms respectively. What is the total time to resolve the name? (CO2)
c. Discuss why layering helps in designing complex network protocols. (CO3)

Q3. (2X10=20 Marks)

a. Describe the role of encapsulation and decapsulation in layered protocol communication. (CO3)
b. Given a 5-layered model, if each layer adds a 20-byte header and a message is 200 bytes, what is the total transmission size? (CO3)
c. Compare and contrast persistent vs non-persistent HTTP. Under what circumstances is each preferred? (CO4)

Q4. (2X10=20 Marks)

a. Analyze the working of cookies in maintaining state in stateless HTTP connections. What are the security and privacy concerns associated with them? (CO4)
b. A network engineer is evaluating reliable data transfer protocols for different types of error-prone channels. How should they approach selecting among Stop-and-Wait, Go-Back-N, and Selective Repeat protocols based on performance, complexity, and retransmission strategy? (CO5)
c. Describe how TCP handles connection setup and teardown with state diagrams. (CO5)

Q5. (2X10=20 Marks)

a. Discuss how TCP implements flow control and congestion control mechanisms. (CO5)
b. Discuss how NAT allows multiple devices to share one public IP address. (CO6)
c. A company is allocated an IP block of 192.168.10.0/24. It needs to create 5 subnets with at least 30 hosts each. Design the subnetting scheme using CIDR and show all calculations. (CO6)