Sub:- Computer Network, Semester-6th(CSE & IT), Full mark-25

(Answer any 5 questions, including Question no.1)

Q.1. (Answer ALL questions) [1x5]

(a) The DNS service in the Internet is distributed by design. Alternatively, DNS could have a centralized design instead. List two disadvantages of a centralized design. Justify your answer.

(b) List two advantages of deploying a Web cache (i.e. a proxy server) in an institutional network.

(c) What is the need for the UDP? Would it not have been enough to just let user processes send raw IP packets? Explain in few sentences.

(d) What are the four factors involved in packet delay? Give details of each delay in few lines.

(e) Justify the need of protocol in networking. In, particular a protocol defines four things. What are these four things?

Q.2. [3+2]

(a) How does TCP determine the time-out for implicit detection of packet loss? Be brief.

(b) Sketch the flow of a typical email from Alice to Bob. Assume that Alice and Bob are on different "networks" (say, they are located in different parts of the world). Identify the key components (both hardware and software) and protocols in the flow.

Q.3. [3+2]

a) What is DNS and what is it used for? If all DNS servers could be "crashed" (taken offline), what would happen to the Internet (be precise).

b) Sketch the TCP connection initiation and connection termination packet flows using a timing diagram.

Q.4. [3+2]

(a) What is the limitation of Go-Back-N ARQ? How this limitation is taken care by Selective-Repeat ARQ?

(b) Explain the technique "Rarest First" in Bit Torrent protocol. How does a peer decide from which neighbour it should download a file out of many neighbours.

Q.5. [3+2]

(a) Host A wants to send a large file to host B. The path from host A to host B has two links, of rates R1=3 Mbps and R2=400 kbps. Assuming no other traffic in the network, find out the throughput for the file transfer. If R1 become half, then what is the throughput?

(b) Discuss the cause and the costs of congestion in the scenario where there are two senders and finite buffers.

Q.6. [3+2]

(a) Suppose two hosts, **A** and **B**, are separated by 20,000 kilometers and are connected by a direct link of $\boldsymbol{R}$ = 2 Mbps. Suppose the propagation speed over the link is 2.5 x 10^8 m/s.

i. Calculate the propagation delay, $\boldsymbol{d_{prop}}$.

ii. Calculate the maximum number of bits that can be in the link (i.e the bandwidth-delay product, $\boldsymbol{R}$ x $\boldsymbol{d_{prop.}}$).

iii. Consider sending a file of 800,000 bits from Host **A** to Host **B**. Suppose the file is sent continuously as one large message. Calculate the total time taken to send the file.

(b) Explain why OSI is called as a model, whereas TCP/IP is called as a protocol suite. Be precise.