INDIAN INSTITUTE OF TECHNOLOGY KHARAGPUR
Department of Computer Science and Engineering

Subject Code: CS31204   **Class Test 1**
Subject Name: Computer Networks   **Full Marks:** 25
**Date:** 06th February 2025   **Time:** 1 Hour

Instructions:
- Answer all the questions. The answers should be precise and to the point.
- Write your answer at the designated spaces only. Marks won't be awarded for answers written elsewhere.
- Write your assumptions clearly, if any. No queries will be entertained during the exam hour.

1. Answer the following questions in terms of circuit switching and packet switching networks.
    a. Can you experience queuing delays in a circuit-switched network? Explain your answer.
    b. Circuit switching has less complexity than packet switching for application data management. Explain two reasons why we still prefer packet switching for computer networks.   **[2.5+2.5 = 5 Marks]**

2. A packet of size 1,500 bytes is sent from source node A to destination node B through a network with transmission rate of 100 Mbps and propagation speed of 2×10^8 m/s. Distance between A and B is 2,500 km, and it takes about 3 ms processing time at node A for error checking etc. If there are 50 routers in the path between A and B, and the average queuing delay at a router is 5 ms, what is the total delay experienced by the packet in reaching its destination B from node A?
                                                                        [5 Marks]
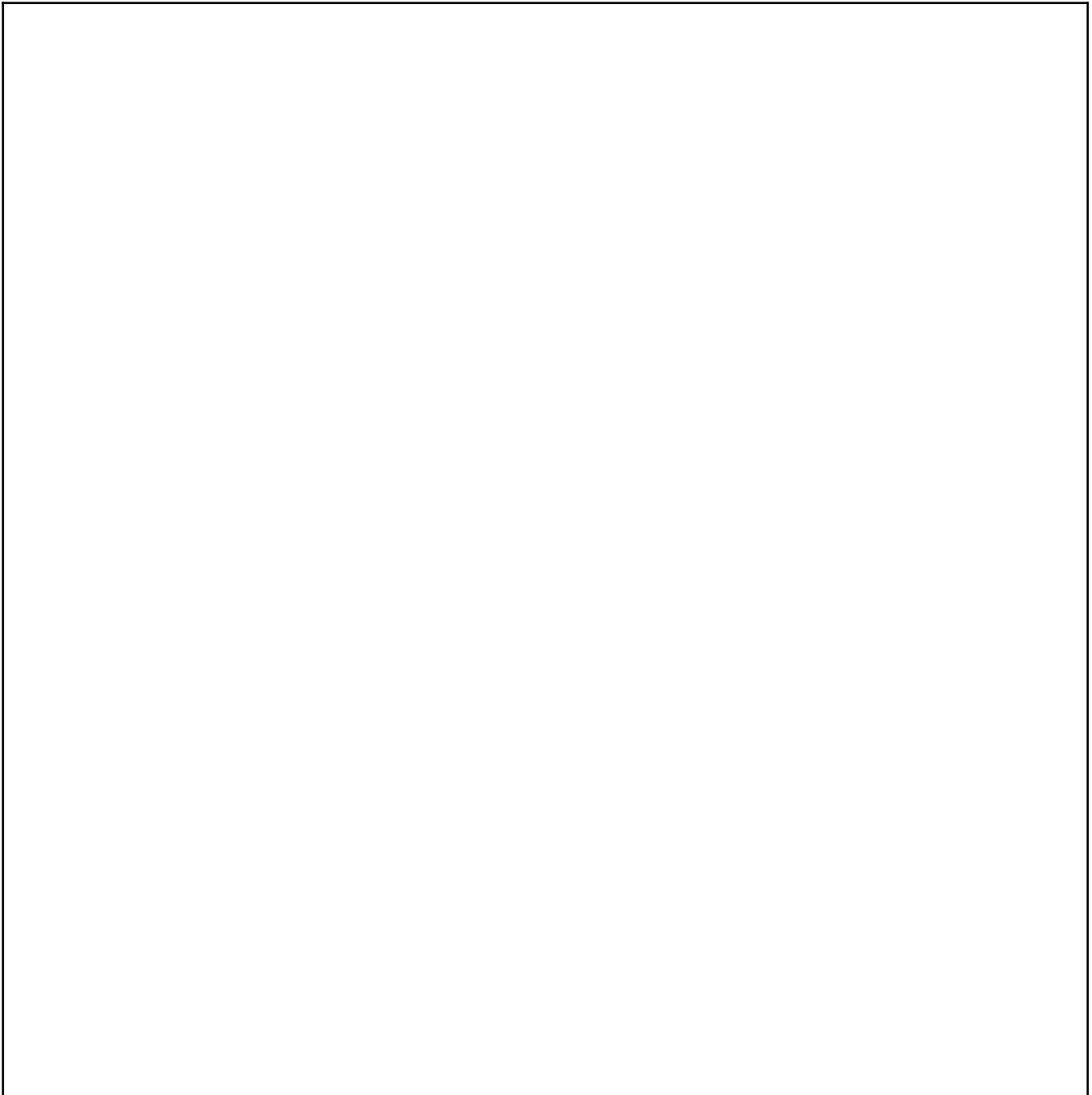
3. The HTTP request below is captured from a network packet dump:

```
GET /index.html HTTP/1.0
Host: www.example.com
User-Agent: Mozilla/5.0
Accept: text/html
Connection: keep-alive
```

Analyze the request and explain how HTTP/1.0 handles connections by default. What role does the "Connection: keep-alive" header play in this request? How does connection management in HTTP/1.0 differ from HTTP/1.1, and what improvements were introduced in HTTP/1.1 to enhance efficiency in web communication? **[5 Marks]**

4. (a) When a user enters www.example.com into a web browser, describe the sequence of interactions that take place between the client and different DNS servers until the IP address is obtained. How do these servers work together to complete the resolution? **[5 Marks]**

(b) Suppose the query takes 20 ms to reach the resolver, followed by additional delays of 15 ms each for communicating with every other name server. What is the total time taken for the DNS resolution, and how could caching help reduce this delay in future queries? **[5 Marks]**