(3 Hours) **[Total Marks: 80]**

Instructions:

N.B. : (1) Question No 1 is Compulsory.
(2) Attempt any three questions out of the remaining five.
(3) All questions carry equal marks.
(4) Assume suitable data, if required and state it clearly.

Q1. **Attempt any 4 questions out of 6. Each question carries** **5 marks.**

a) Compare between DOS, NOS and Middleware.
b) Explain with the diagram Dispatcher-Worker thread model.
c) Explain happens before relation with its features.
d) Explain naming in a distributed system.
e) Compare caching and replication.
f) Explain stream - oriented communication.

Q2. **Each question carries** **10 marks.**

i. Explain in detail Raymond's Tree-Based algorithm (Token-based algorithm).
ii. Write a note on the Network File System (NFS) .

Q3. **Each question carries** **10 marks.**

i. Write note on Andrew File System (AFS) .
ii. Explain steps involved in the RMI execution process in detail.

Q4. **Each question carries** **10 marks.**

i. What is Remote Procedure Call?Explain the working of RPC in detail.
ii. Explain different types of distributed systems with diagrams.

Q5. **Each question carries** **10 marks.**

i. Explain with diagrams various client-centric consistency models.
ii. Compare static and dynamic load balancing algorithms.

Q6. **Each question carries** **10 marks.**

i. Explain with an example load sharing approach.
ii. Explain any one election algorithm in detail with suitable example.
