1. a) How can an organization enforce the use of a web proxy gateway and prevent its users to directly access external web servers? 
b) Differentiate between slightly coupled systems and loosely coupled systems. 
c) Define confidentiality and integrity in a distributed system. Mention different types of security threats applicable in computer systems? 
d) What are the different files attributes associated with a Network File System? Write down the function of each of them. 
e) Mention the reasons for which the normal functioning of an RPC may get disrupted. 
f) What are different types of authentication supported by SUN RPC? 
g) Why do we need Internetworks? How can you implement it? (7x4)

2. a) Define a transparent RPC mechanism. How can you achieve this? What are the differences between Local Procedure Call (LPC) and RPC due to which semantics transparency cannot be achieved? 
b) How can you implement RPC mechanism? (12+6)

3. a) Give the reasons for migrating code. How can you differentiate weak mobility from strong mobility? Give characteristic features of each of them. 
b) Briefly describe three types of binding used in the migration of the code and execution segment. (10+8)

4. a) Define nested transaction. Why do we need nested transaction? Explain with the help of an example. 
b) What is the goal of concurrency control? Write the advantages of 2-phase locking. What are the different ways of implementing basic 2-phase locking scheme? Describe them briefly. (6+12)

5. a) Define the term ‘protocol’. Name and define two types of data transport services. Draw the address structure for class C Internet addresses. Explain each component. What is Marshalling in networking? 
b) What is the role of multicast message in group communication? Where is it used? (12+6)
6. Write down the use of distributed shared memory. As a communication mechanism, how can we compare DSM with message passing? Define thrashing related to DSM.

7. Explain in detail three main approaches to the implementation of distributed shared memory.

7. What are the different strategies of security mechanisms for distributed System? Explain each strategy in brief.

b) For an N process system, describe an algorithm to detect violation of mutual exclusion for any run (violation of the safety rule of ME). Assume that the computation can be modified so that vector clocks are available for the states in which processes are in the critical section. Analyze your algorithm in terms of numbers of comparisons of vectors. Assume the algorithm runs in an external “checker” process.