Time: 3 Hours **Marks: 80**

1. Question 1 is compulsory.
2. Attempt any three from the remaining five questions.
3. Assume suitable data where required.

1 a.) What do you understand by Hybrid Kernel? Give suitable example. [5]
b.) Explain Cache Affinity. [5]
c.) Differentiate between Hard Real Time and Soft Real Time operating system. [5]
d.) Explain middleware and its role in distributed system. [5]

2 a.) What is buffer cache? Describe the structure of the buffer header. [10]
b.) What is U Area? Explain in detail. [10]

3 a.) Explain Transparency design issues in distributed computing. [10]
b.) Mach OS ensures location independency during Inter-Process Communication. Explain in detail. [10]

4 a.) Differentiate between Clock Driven and Event Driven scheduler. [10]
b.) What are the criteria for selecting appropriate frame size in cyclic scheduler? Compute suitable frame size for the following. e stands for executing time, p stands for period and d stands for deadline. All the timing parameters are in miliseconds. [10]
e1=1, p1=4 d1=4;
e2=1, p2=5 d2=5;
e3=1.5, p3=20, d3=20

5 a.) Explain Test & Set lock algorithm. Discuss the benefits of Test Test & Set over Test & Set algorithm. [10]

b.)Explain non-uniform memory access (NUMA) architecture? Explain cache coherency in NUMA types multiprocessor. [10]

6 a.)Discuss various issues of cloud OS. [10]
b.)Explain Android OS architecture in detail. [10]
