ALCCS

Code: CS31   **Subject: OPERATING SYSTEMS**

Time: 3 Hours   **SEPTEMBER 2010**   **Max. Marks: 100**

NOTE:
- **Question 1 is compulsory and carries 28 marks. Answer any FOUR questions from the rest. Marks are indicated against each question.**
- **Parts of a question should be answered at the same place.**

Q.1 a. Differentiate between multiprogramming, multitasking, timesharing and multiprocessing systems.

b. Briefly explain Process Control Block (PCB).

c. What is a semaphore? What is its use?

d. What is a system call? How it is different from a Library Call?

e. Differentiate between physical address and logical address.

f. What is the meaning of the term busy waiting? What other kinds of waiting are there? Can busy waiting be avoided altogether?

g. What is the difference between logical clock and physical clock? Briefly explain with an example.
(7×4)

Q.2 a. Explain how short term, medium term, and long term scheduler work giving suitable example.
(9)

b. Explain Synchronous and Asynchronous RPC (Remote Procedure Call) mechanism with an example.
(9)

Q.3 a. What are the benefits of a distributed file system when compared with a file in a centralized system?   **(9)**

b. What aspects of a distributed system would you select for a system running on a totally reliable network?
(9)

Q.4 a. Write Banker's safety algorithm and prove that the Banker's safety algorithm requires an order of $M \times N^2$ operations.
(9)

b. What do you mean by critical section? Using semaphores, write a solution to the readers and writers problem that gives priority to readers.

(The readers and writers problem: any number of readers may simultaneously be reading from a file, and no reader can be reading while a writer is writing).   **(9)**

Q.5 a. Consider the following snapshot of a system:

	Allocation	Max	Available
	ABCD	ABCD	ABCD
P0	0012	0012	1520
P1	1000	1750	
P2	1354	2356	
P3	0632	0652	
P4	0014	0656	

Answer the following questions using Banker's algorithm:
i)   What is the content of matrix Need?
ii) Is the system in a safe state?
iii) If a request from P1 arrives for (0,4,2,0), can the request be granted   immediately?
Apply banker's safety algorithm to test this.   **(9)**

b. How many types of multiprocessor Operating Systems are there? Explain its functions and requirements.
                              (9)

Q.6 a. When do page faults occur? Describe the actions taken by the operating system when a   page fault occurs.
                              (6)

b. What is the cause of thrashing? How does the system detect thrashing? What are the models   used to avoid thrashing.
                              (6)

c. Explain Direct Memory Access? How does DMA increase system concurrency? How does it complicate hardware design?   **(6)**

Q.7   Write the short notes on:

(a) Interrupt Handlers
(b) Election Algorithms in Distributed OS.
(c) Starvation & Aging   **(6+6+6)**