Fifth Semester B.E. Degree Examination, December 2010
Operating Systems

Time: 3 hrs.

Max. Marks:100

Note: *Answer any FIVE full questions.*

1 a. What is an operating system? Explain the goals of an operating system. **(06 Marks)**
   b. Define the essential properties of the following operating systems:
      i) Time sharing operating system   ii) Batch operating system
      iii) Real time operating system   iv) Distributed operating system. **(08 Marks)**
   c. Mention the different system structures employed in a modern operating system. Explain the virtual machine approach. **(06 Marks)**

2 a. Explain the process state, with the diagram. What is the need for a context switch? **(07 Marks)**
   b. What are schedulers? Explain various schedulers, with diagrams. **(07 Marks)**
   c. What is interprocess communication? Explain. **(06 Marks)**

3 a. Suppose four processes arrive for processing in the order P1, P2, P3 and P4 with burst times and priorities as given below:

Process	P1	P2	P3	P4
Burst time	7	4	3	5
Priority	3	4	2	1

   Draw the Gantt charts and calculate the average waiting time for the following algorithms :
   i) First Come First Served   ii) Shortest Job First   iii) Priority scheduling. **(08 Marks)**
   b. What is a deadlock? List the necessary conditions for a deadlock to occur. Explain the Banker's algorithm. **(12 Marks)**

4 a. Explain the terms : critical section and mutual exclusion. **(05 Marks)**
   b. What is a semaphore? Explain the role of a semaphore in solving a critical section problem. **(10 Marks)**
   c. What are monitors? Explain. **(05 Marks)**

5 a. Explain the following page replacement algorithms:
      i) Optimal   ii) LRU
      To the reference string 1 0 7 1 0 3 1 3 2 0 3 2 4 0 3 2 1 0 7, find how many page faults would occur for these algorithms, if the number of frames is 3. **(10 Marks)**
   b. Explain the segmentation memory management. Describe the hardware support that is required for its implementation. **(10 Marks)**

6 a. Explain any two file allocation methods with their merits and demerits. **(08 Marks)**
   b. Explain the following disk scheduling algorithms:
      i) SSTF   ii) SCAN   iii) LOOK **(07 Marks)**
   c. What are the different file access methods? Explain briefly. **(05 Marks)**

7 a. Explain briefly various types of program threats and system threats. **(10 Marks)**
   b. Explain the access matrix model of protection and its implementation. **(10 Marks)**

8 Write short notes on: a) System calls   b) Threads
      c) Virtual memory   d) Design principles of Linux system. **(20 Marks)**

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