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**Third Semester MCA Degree Examination, December 2011**  
**Operating Systems**

Time: 3 hrs.

Max. Marks:100

**Note: Answer any FIVE full questions.**

- 1
  - a. What do you mean by operating system? Explain the functionality of an operating system. (04 Marks)
  - b. What do you mean by bootstrap program? Explain briefly. (04 Marks)
  - c. Describe the differences between the symmetric and asymmetric multiprocessing. What are the advantages of multiprocessor system? (05 Marks)
  - d. What is a system call? Explain the types of system calls. (07 Marks)
- 2
  - a. Define process. Explain the different states of a process, with the help of diagram. (05 Marks)
  - b. What do you mean by CPU scheduling algorithm? Explain the scheduling criteria of algorithm. (07 Marks)
  - c. Consider the following set of processes with the length of the CPU burst given in milliseconds:

<u>Process</u>	<u>Arrival time</u>	<u>Burst time</u>
P <sub>1</sub>	0	8
P <sub>2</sub>	1	4
P <sub>3</sub>	2	9
P <sub>4</sub>	3	5

Draw the Gantt chart, calculate the waiting time of each process and average waiting time using the following algorithms:

- i) SJF (Preemptive)      ii) SJF (non-preemptive) (08 Marks)
- 3
  - a. What do you mean by the critical section problem? What are the requirements needed to solve critical section problem? (06 Marks)
  - b. What is semaphore? Explain its usage and implementation in multiprocessor system. (06 Marks)
  - c. What are the different classical problems of synchronization? Explain any two. (08 Marks)
- 4
  - a. What is deadlock? Explain with the help of resource allocation graph. (06 Marks)
  - b. What do you mean by deadlock avoidance? Explain the Banker's algorithm for deadlock avoidance. (08 Marks)
  - c. Explain the process to recover from deadlock. (06 Marks)
- 5
  - a. Distinguish between the logical and physical address space. (04 Marks)
  - b. How many page faults occur for FIFO, optimal and LRU page replacement algorithm for the following reference string with three page frames?  
 7, 0, 1, 2, 0, 3, 0, 4, 2, 3, 0, 3, 2, 1, 2, 0, 1, 7, 0, 1 (06 Marks)
  - c. What do you mean by segmentation? Explain with the help of example. (06 Marks)
  - d. Explain the difference between the internal and external fragmentation. (04 Marks)

- 6** a. What are the six basic file operations? Explain in detail. (06 Marks)  
b. Explain the different file access methods. (04 Marks)  
c. Explain the file allocation methods with their merits and demerits. (06 Marks)  
d. Write a short note on the free space management. (04 Marks)
- 7** a. Define disk scheduling. What are the disk scheduling methods available? Explain any four in detail with example. (12 Marks)  
b. What do you mean by system protection? Explain the domain of protection, in detail. (08 Marks)
- 8** Write short notes on the following :  
a. Components of Linux system  
b. fork() and exec() process model  
c. Virtual memory management in the Linux system  
d. Interprocess communication. (20 Marks)

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