Fifth Semester B.E. Degree Examination, June 2012
Operating Systems

Time: 3 hrs.   Max. Marks:100

Note: *Answer FIVE full questions, selecting*
at least TWO questions from each part.

PART – A

1 a. What is an operating system? Bring out the requirements of,
     i)   Real time operating systems.
     ii)   Distributed operating systems.   **(10 Marks)**
   b. What are system calls? Explain the different categories of the system calls.   **(10 Marks)**

2 a. Explain the process states with a diagram. What is the need for a context switch?   **(07 Marks)**
   b. What are the differences between user level threads and kernel supported threads? **(05 Marks)**
   c. For the following example calculate average waiting time and average turn around time by using FCFS, preemptive SJF and RR (1 time unit) CPU scheduling algorithms.   **(08 Marks)**

Jobs	Arrival time	Burst time
P_1	0	8
P_2	1	4
P_3	2	9
P_4	3	5

3 a. What is critical section problem? How does a semaphore solve the critical section problem? Discuss whether semaphores satisfy the three requirements for a solution to the critical section problem.   **(08 Marks)**
   b. What are monitors? Explain with an example program request.   **(04 Marks)**
   c. Describe the monitor solution to the classical dining philosopher's problem.   **(08 Marks)**

4 a. What is deadlock? Explain the necessary conditions for its occurrence.   **(06 Marks)**
   b. Explain with an example how resource allocation graph is used to describe the deadlock.   **(06 Marks)**
   c. System consists of five processes (P_0, P_1, P_2, P_3, P_4) and three sources (R_1, R_2, R_3). Resource type R_1 has 10 instances, resource type R_2 has 5 instances and R_3 has 7 instances. The following snapshot of the system has been taken:

Jobs	Allocation			Max			Available		
	R_1	R_2	R_3	R_1	R_2	R_3	R_1	R_2	R_3
P_0	0	1	0	7	5	3	3	3	2
P_1	2	0	0	3	2	2			
P_2	3	0	2	9	0	2			
P_3	2	1	1	2	2	2			
P_4	0	0	2	4	3	3			

Calculate the content of matrix need and find out safe sequence by using Banker's algorithm.   **(08 Marks)**

PART – B

5 a. Distinguish between :
   i) Logical address space and physical address space.
   ii) Internal fragmentation and external fragmentation.
   iii) Paging and segmentation. **(06 Marks)**
   b. Explain with the help of supporting hardware diagram how the TLB improves the performance of a demand paging system. **(10 Marks)**
   c. Given memory partitions of 100 K, 500 K, 200 K, 300 K and 600 K (in order) how would each of the first fit, best fit and worst fit algorithms work place processes of 212 K, 417 Km 112 K and 426 K (in order)? Which algorithm makes the most efficient use of memory? **(04 Marks)**

6 a. Explain the different types of files. **(05 Marks)**
   b. Name the different file allocation methods. Explain the linked allocation of file implementation with merits and demerits. **(08 Marks)**
   c. Define file system. Explain the different directory structure. **(07 Marks)**

7 a. What is disk scheduling? Explain any 3 disk scheduling methods with examples. **(10 Marks)**
   b. What is swap space management? Explain. **(05 Marks)**
   c. What is access matrix? Explain access matrix with domains as objects. **(05 Marks)**

8 Write short notes on the following:
   a. Process management in Linux. **(06 Marks)**
   b. Page replacement algorithms. **(08 Marks)**
   c. Steps in handling a page fault. **(06 Marks)**

* * * * *