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Total number of printed pages – 3

B. Tech
PCCS 4304

Sixth Semester Examination – 2013

OPERATING SYSTEM

BRANCH : BIOMED/ FASHION/ EEE/ ELECT./ AEIE/ ICE/ IEE/ MME/ EIE/ MM

QUESTION CODE : A 287

Full Marks – 70

Time : 3 Hours

Answer Question No. 1 which is compulsory and any **five** from the rest.

The figures in the right-hand margin indicate marks.

1. Answer the following questions in brief : 2×10
- (a) What is a Semaphore ? What are its uses ?
 - (b) What is a thread ? Why is it used ?
 - (c) Write four conditions of dead lock occurrence.
 - (d) Differentiate between a page and a segment.
 - (e) Differentiate between internal and external fragmentation.
 - (f) Differentiate between a logical file system and a physical file system.
 - (g) Differentiate between a process and a program.
 - (h) Differentiate between time-sharing and batch processing operating system.
 - (i) Write down the functions of operating system.
 - (j) Explain Belady's anomaly.

P.T.O.

2. Consider the following set of processes, with the length of CPU burst time given in milliseconds. 10

<u>Process</u>	<u>Burst Time</u>	<u>Priority</u>
P ₁	10	3
P ₂	1	1
P ₃	2	3
P ₄	1	4
P ₅	5	2

Assume all processes have arrived at time, $t = 0$, in order, P₁, P₂, P₃, P₄, P₅

- (i) Draw four Gantt charts illustrating the execution of these processes using FCFS, SJF, a non preemptive priority (a smaller priority number implies a higher priority), and RR (quantum = 1) scheduling.
 - (ii) What is the turnaround time of each process for each of the scheduling algorithms in part (i)
 - (iii) What is the waiting time of each process for each of the scheduling algorithms in part a ?
 - (iv) Which of the schedules in part a results in the minimal average waiting time over all processes ?
3. Consider the following snapshot of a system.

	<u>Allocation</u>	<u>Max</u>	<u>Available</u>
	A B C D	A B C D	A B C D
P ₀	0 0 1 2	0 0 1 2	1 5 2 0
P ₁	1 0 0 0	1 7 5 0	
P ₂	1 3 5 4	2 3 5 6	
P ₃	0 6 3 2	0 6 5 2	
P ₄	0 0 1 4	0 6 5 6	

Answer the following questions using Banker's algorithm. 10

- (a) What is the content of the matrix Need ?
- (b) Is the system in a safe state ? If so, what is the safe sequence ?
- (c) If a request from process P₁ arrives for (0, 4, 2, 0), can the request be granted immediately ?

4. (a) Explain various file allocation methods with their advantages and disadvantages. 5
 (b) Describe various file system recovery methods. 5
5. Describe paged-segmented memory management technique in details. 10
6. Consider the following page reference string : 10
 1,2,3,4,2,1,5,6,2,1,2,3,7,6,3,2,1,2,3,6
- How many page faults would occur for the following replacement algorithms, assuming one and two frames ? Remember all frames are initially empty, so your first unique pages will all cost one fault each.
- (i) LRU replacement
 (ii) FIFO replacement
 (iii) Optimal replacement
7. (a) What is virtual memory and thrashing ? Explain them. 5
 (b) Explain various states of a process with help of process state transition diagram. 5
8. Suppose that the head of a moving-head disk with 200 tracks, numbered 0 to 199, is currently serving a request at track 143 and has just finished a request at track 125. The queue of requests is kept in the FIFO order : 10
 86, 147, 91, 177, 94, 150, 102, 175, 130
- What is the total number of head movements needed to satisfy these requests for the following disk-scheduling algorithms ?
- (a) FCFS scheduling
 (b) SSTF scheduling
 (c) SCAN scheduling
 (d) LOOK scheduling
 (e) C-SCAN scheduling.

