Registration No. :

Total number of printed pages – 3

B. Tech

PCCS 4304 (New)

Sixth Semester (Back) Examination – 2013

OPERATING SYSTEMS

BRANCH : EC, ETC, IT

QUESTION CODE : B 299

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 multiprogramming and time sharing system.

   (h) What is thrashing ?

   (i) Differentiate between index file and sequential file.

   (j) Write down the functions of operating system.

2. Consider the following set of processes with their CPU burst time given in milliseconds.

   10

Process	Burst Time	Priority
P$_1$	10	3
P$_2$	1	1
P$_3$	2	3
P$_4$	1	4
P$_5$	5	2

P.T.O.

Assume all processes have arrived at time, $t = 0$, in order, P_1, P_2, P_3, P_4, P_5

(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 a ?

(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 :   10

	Allocation A B C D	Max A B C D	Available 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 the Banker's algorithm :

(i) What is the content of the matrix Need ?

(ii) Is the system in a safe state ? If so, what is the safe sequence ?

(iii) If a request from a process P_1 arrives for (0, 4, 2, 0) can the request be granted immediately ?

4. (a) Explain various treading models.   5

(b) What is inter process communication? Give examples of IPC systems.   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) Describe various file access methods. 5

(b) Discuss various types of file structures. 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