ROLL NO. _____

Code: CT31 **Subject: OPERATING SYSTEM**

ALCCS

Time: 3 Hours **FEBRUARY 2014** **Max. Marks: 100**

PLEASE WRITE YOUR ROLL NO. AT THE SPACE PROVIDED ON EACH PAGE IMMEDIATELY AFTER RECEIVING THE QUESTION PAPER.

NOTE:

- **Question 1 is compulsory and carries 28 marks. Answer any FOUR questions from the rest. Marks are indicated against each question.**
- **Parts of a question should be answered at the same place.**

Q.1 a. What do you understand by Process, Thread and Fiber? Give a suitable example for each of them.

b. Explain what is multilevel feedback scheduling with suitable example.

c. Discuss file system in MS-DOS. Compute number of entries required in G FAT table for the given following parameters:
Disk capacity-30Mbyte, Block size-512 bytes, Blocks/cluster-2.

d. A system is in unsafe state. Is it possible for processes to complete their execution without entering into deadlock? If yes, show how?

e. How are critical section and the principle of mutual exclusion related to each other?

f. Discuss the merits and demerits of buddy.

g. What is Multiprocessor and Distributed OS algorithm? **(7 × 4)**

Q.2 a. Following is the snapshot of a CPU

Process	CPU Burst	Arrival Time
P1	10	0
P2	29	1
P3	03	2
P4	07	3

Draw the Gantt chart and calculate the turnaround time and waiting time of the jobs for FCFS (First Come First Served), SJF (Shortest Job First), SRTF (Shortest Remaining Time First) and RR (Round Robin with time quantum 10) scheduling algorithms. **(12)**

b. A CPU scheduling algorithm determines an order for the execution of its scheduled processes. Given n processes to be scheduled on one processor, how many different possible schedules are there? Give a formula in terms of n. **(6)**

Q.3 a. Assuming a cluster size of 512 bytes, calculate the percentage of wastage in file space due to incomplete filling of last clusters, if the file sizes are:
(i) 1200 bytes (ii) 20,000 bytes. **(9)**

b. At some point in time, the following holes (in the order) are created by a variable partition of memory. 20K, 15K, 40K, 60K, 10K, 25K. For a new process of 25 K, which hole would be filled using best fit, first fit, and worst fit? **(9)**

Q.4 a. What is the "Locality of Reference" concept and why it is important? What is the need to have a logical to physical map? Is it by design or incidental that the page sizes are chosen to be power of two? **(9)**

b. Consider a system consisting of *m* resources of the same type, being shared by *n* processes. Resources can be requested and released by processes only one at a time. Show that the system is deadlock-free if the following two conditions hold: **(9)**

(i) The maximum need of each process is between 1 and *m* resources

(ii) The sum of all maximum needs is less than $m + n$

Q.5 a. Assume that we have a paging system with page table stored in memory. If a memory reference takes 200 ns, how long does a paged memory reference take? If we add associative registers and 75% of all page table references are found in the associative registers, than what is the effective memory reference time? Assume that finding a page table entry in the associative registers takes zero time if the entry is there. **(9)**

b. For the given snapshot of a system:

	Allocation	Max	Available
	A B C D	A B C D	A B C D
P1	0 0 1 2	0 0 1 2	1 5 2 0
P2	1 0 0 0	1 7 5 0	
P3	1 3 5 4	2 3 5 6	
P4	0 6 3 2	0 6 5 2	
P5	0 0 1 4	0 6 5 6	

Answer the following using Banker's Algorithm:

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

(ii) Is the system in a safe state?

(iii) If a request from process P2 arrives for (0, 4 2, 0), will it be granted? **(9)**

Q.6 a. Why the interrupt disable method to achieve mutual exclusion does not work in a multiprocessor system? Write your answer citing an example. **(9)**

b. To provide a single image of the OS, distributed OS has to address number of transparency issues. Briefly discuss few important transparency issues in distributed OS. **(9)**

Q.7 Write short notes on the following:

(i) Page replacement methods

(ii) Multimedia system

(iii) Bernstein's condition for concurrency **(3×6)**