

Roll No.

[2]

BCA-402(N)

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**B. C. A. (Fourth Semester)
EXAMINATION, May, 2019**

**(New Course)
Paper Second
OPERATING SYSTEM**

Time : Three Hours [*Maximum Marks : 75*]

Note : Attempt questions from all Sections as directed.

Inst. : The candidates are required to answer only in serial order. If there are many parts of a question, answer them in continuation.

Section—A

(Short Answer Type Questions)

Note : All questions are compulsory. Each question carries 3 marks.

1. (A) Differentiate between hard real time system and soft real time system.
- (B) Explain Belady's anomaly.
- (C) What do you understand by Synchronization Hardware ?
- (D) How jobs are scheduled in multiple processor system ?
- (E) What are *four* necessary conditions responsible for deadlocks ?
- (F) Discuss when a resource allocation graph contains a cycle but no deadlock.

(B-4) P. T. O.

- (G) How the logical address is converted to physical address ? Explain.
- (H) What do you understand by internal fragmentation ? How this can be resolved ?
- (I) What is a hash table ? How is it used ?

Section—B

(Long Answer Type Questions)

Note : Attempt any *two* questions. Each question carries 12 marks.

2. (a) Discuss Second chance page replacement algorithm. 6
- (b) For given reference string, calculate the number of page faults using optimal page replacement algorithm. Given page size = 3. 6
7 0 1 2 0 3 0 4 2 3 0 3 2 1 2 0 1 7 0 1
3. (a) What is thrashing ? Explain causes of thrashing in detail. Also suggest its solution. 8
- (b) Differentiate between segmentation and paging. 4
4. (a) Differentiate between Asymmetric multiprocessing and Symmetric multi-processing. 4
- (b) Consider the following set of processes with the length of the CPU burst given in milliseconds : 8

Process	Burst Time	Priority
P ₁	10	3
P ₂	1	1
P ₃	2	3
P ₄	1	4
P ₅	5	2

The processes are assumed to have arrived in the order, P_1, P_2, P_3, P_4, P_5 , all at time 0.

- (i) Draw four Gantt Charts that illustrate the execution of these processes using the following scheduling algorithms : FCFS, SJF, non-pre-emptive priority (taking smaller priority number implies a higher priority) and RR (quantum = 1).
- (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 algorithm in part (i) ?
- (iv) Which of the Algorithm in part (i) a results in the minimum average waiting time (over all processes) ?

5. (a) What do you understand by Critical Section problem ? What requirements must be satisfied by its solution ? 6
- (b) What is the Dining-Philosophers problem ? Suggest its solution. 6

Section—C

(Long Answer Type Questions)

Note : Attempt any two questions. Each question carries 12 marks.

6. (a) The long-term scheduler controls the degree of multiprogramming. Justify by giving examples. Also discuss the need of mid-term scheduler. 6
- (b) Discuss the Disk-Space management methods. 6
7. Suppose the head of moving disk is currently serving at request at track 60. If the queue of request is kept in

FIFO order, what is the total head movement to satisfy these requests for the following disk scheduling algorithms :

- (i) FCFS
- (ii) SSTF
- (iii) SCAN
- (iv) C-SCAN

Disk request come into the disk drives for cylinders 65, 170, 35, 120, 10, 140 in that order. 12

8. (a) Discuss Banker's Algorithm. 4
- (b) Consider the following snapshot of a system :

	Allocation				Max				Available			
	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 the Banker's Algorithm :

- (i) What is the content of the matrix need ? 1
- (ii) Is the system in a safe-state ? 4
- (iii) If a request from process P_1 arrives for (0, 4, 2, 0) can be request granted immediately. 3