

22/5065
B.C.A. (Fourth Semester)
Examination, 2022
Second Paper
(Operating System)

Time : Three Hours]

[Maximum Marks : 75

Note : Attempt any **five** questions. **All** questions carry equal marks.

Note : The answers to short answer type questions should not exceed **200** words and the answers to long answer type questions should not exceed **500** words.

1. (a) Explain FCFS, LRU and optimal page replacement Algorithms. Which algorithm suffer's from Belady's anomaly? 7
- (b) Consider the page reference string : 1, 2, 3, 4, 2, 5, 3, 4, 2, 6, 7, 8, 7, 9, 7, 8, 2, 5, 4 and 9. Calculate how many page faults would occur for LRU and FIFO page replacement algorithms? 8

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2. (a) What is a deadlock? Explain the necessary and sufficient conditions for deadlock occurrence. Also explain how deadlock can be prevented? 5
- (b) Consider the following snapshot of a system : 10

	Allocation			Maximum			Available		
	A	B	C	A	B	C	A	B	C
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			

Answer the following questions using Banker's algorithm :

- (i) Is the system in a safe state?
 - (ii) If a request from P_1 arrives for (1,0,2), Can the request be granted immediately? Show it.
3. (a) What do you understand by disk scheduling? Discuss disk scheduling algorithm. List the advantages of SCAN over C-SCAN Algorithm. 5
 - (b) Calculate the total head movement with FCFS, SSTF and SCAN disk sched-

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using Algorithms for the given block sequence :

40, 66, 73, 146, 34, 59, 76, 123, 39, 83, 91, 14 initially the head is at block number 1. Draw the diagram for all the algorithms. 10

- 4 (a) Explain the concept of thrashing with the help of diagram. How can we prevent it? 5
- (b) Discuss any **two** of the following in brief : 10
- File attributes and types
 - ~~Sequential file access~~
 - Direct file access
 - Tree structured directories
- 5 (a) What is the critical section problem? Discuss any one solution of critical section problem. 5
- (b) Differentiate between any **two** of the following : 10
- Internal and External Fragmentation <https://www.mgkvponline.com>
 - Demand paging and Demand Segmentation
 - Fixed and variable partition
 - First fit, Best fit and Worst fit
- 6 (a) Explain with a diagram, how paging supports the virtual memory. Also ex-

plain how a logical address is translated into a physical address in paging. 5

- (b) Draw the Gantt chart for the Round Robin (RR) scheduling policy and calculate the average turnaround time, average waiting time, throughput and processor utilization for the following set of processes : 10

(Quantum in 3)

Process	CPU Burst Time
P ₁	04
P ₂	14
P ₃	06
P ₄	07

- 7 (a) Define a process. Explain various states of a process. How does a process differ from a thread? 5
- (b) Differentiate amongst multiprogrammed, multiuser and multitasking operating systems. Also discuss the advantages and limitations of each operating system. 10
- 8 (a) List the content's of process control Block (PCB). Also explain the step's involved in "Context switch" between two process with an illustration. 7
- (b) What are system calls? How are system calls categorized? Explain the sequence of system calls for copying one file to another (new) file. 8