

Roll No.

BCA-3003

B. C. A. (Third Semester)

EXAMINATION, 2022-23

(New Course)

Paper Third

OPERATING SYSTEMS

Time : Two Hours] [Maximum Marks : 75

Note : This paper consists of three Sections A, B and C. Carefully read the instructions of each Section in solving the question paper. Candidates have to write their answers in the given answer-copy only. No separate answer-copy (B Copy) will be provided.

P. T. O.

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Section—A

(Short Answer Type Questions)

Note : All questions are compulsory. Answer the following questions as short answer type questions. Each question carries 5 marks.

1. (A) Define operating systems and discuss its role from different perspectives.
- (B) Write short notes on the following :
 - (i) Simple Batch Systems
 - (ii) Parallel Systems
- (C) Explain the components of an operating system.
- (D) Explain *three* requirements that a solution to critical-section problem must satisfy.
- (E) Explain the resource allocation graph.
- (F) What is demand paging ? Explain.
- (G) Define file and explain file attributes.

- (H) Discuss dedicated devices and shared devices.
- (I) Differentiate between Pre-emptive and Non-preemptive Scheduling.

Section—B

(Long Answer Type Questions)

Note : This section contains four questions from which *one* question is to be answered as long question. Each question carries 15 marks.

2. What do you mean by PCB ? Where is it used ? What are its contents ? Explain.

Or

3. Explain paging scheme of memory management. What hardware support is needed for its implementation ?

Or

4. What is contiguous memory allocation ? Explain the hardware support for memory protection.

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Or

5. Given memory partitions of 100 KB, 500 KB, 200 KB, 300 KB and 600 KB (in order), how would each of the first-fit, best-fit and worst-fit algorithms place processes of 212 KB, 417 KB, 112 KB and 426 KB (in order) ? Which algorithm makes the most efficient use of memory ?

Section—C

(Long Answer Type Questions)

Note : This section contains four questions from which *one* question is to be answered as long question. Each question carries 15 marks. <https://www.csjmuonline.com>

6. What is a process ? Draw and explain process state diagram.

Or

7. (a) Explain *four* necessary conditions for deadlock.

(b) Consider the following snapshot of the system :

	Allocation			Max			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 the Banker's algorithm :

- What is the content of the Matrix Need ?
- Is the system in a safe state ?

Or

- Discuss the properties of different CPU scheduling algorithms.
 - Consider the following set of processes, with burst time and arrival time :

Process	Burst Time	Arrival Time
P ₁	19	0
P ₂	14	1
P ₃	11	2
P ₄	6	3

Calculate the turnaround time and waiting time for both pre-emptive and non-preemptive scheduling using shortest job first algorithm.

Or

- Discuss the access methods and file structure.
 - Discuss the following page replacement algorithm with an example :
 - Optimal
 - LRU