

N.B.: 1) Question No.1 is compulsory.

2) Attempt any **THREE** questions out of remaining **FIVE** questions.

Q1 Answer any FOUR

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- What are the various objectives and functions of the operating system?
- What is the difference between physical address and virtual address?
- Differentiate between open and proprietary operating system
- Explain memory fragmentation
- Explain the Seven State Model of process in OS

- Q2** a) Given five memory partitions of 100 KB, 500 KB, 200 KB, 300 KB, and 600 KB, how would 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?
b) State features of Cloud OS. Enlist its advantages and disadvantages.

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- Q3** a) Explain Peterson's algorithm with pseudo code and example
b) Consider the set of 6 processes whose arrival time and burst time are given. If the CPU scheduling policy is Round Robin with time Quantum = 2 ms, calculate the average waiting time and average turnaround time

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Process ID	Arrival Time (ms)	Burst Time (ms)
P1	0	4
P2	1	5
P3	2	2
P4	3	1
P5	4	6
P6	6	3

- Q4** a) What is an Operating System? Explain structure of Operating System.
b) List page replacement algorithms. Discuss page hit and page fault in different page replacement algorithms.

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Q5 Let us consider the banker's algorithm

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- calculate the content of the need matrix?
- Check if the system is in a safe state?
- Determine the total sum of each type of resource?

Process	Allocation A B C	MAX A B C	Available A B C
P0	1 1 2	4 3 3	2 1 0
P1	2 1 2	3 2 2	
P2	4 0 1	9 0 2	
P3	0 2 0	7 5 3	
P4	1 1 2	1 1 2	

- b) Discuss virtual memory technique. compare a physical address and a virtual address?

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- Q6** a) Explain objectives and characteristics of modern operating system. Explain Real Time OS.
b) Discuss Deadlock in the Operating System. Explain the necessary condition of deadlock

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