

2021

Time : 3 Hours

Full Marks : 80

BH-247

**Candidates are required to give their answers in
their own words as far as practicable.**

The questions are of equal value.

Answer any five questions in which

Q. No.-1 Compulsory.

1. Choose the correct alternatives of the following:
 - (A) Which one of the following errors will be handle
by the operating system?
 - (a) Lack of paper in printer
 - (b) Connection failure in the network
 - (c) Power failure
 - (d) All of the mentioned ✓

- (B) In a timeshare operating system, when the time slot assigned to a process is completed, the process switches from the current state to?
- (a) Suspended state
 - (b) Terminated state
 - (c) Ready state
 - (d) Blocked state
- (C) For an effective operating system, when to check for deadlock?
- (a) Every time a resource request is made at fixed time intervals
 - (b) At fixed time intervals
 - (c) Every time a resource request is made
 - (d) None of the mentioned
- (D) What will happen in the single level directory?
- (a) All files are contained in the same directory
 - (b) All files are contained in different directories all at the same level
 - (c) Depends on the operating system
 - (d) None of the mentioned

- (E) Which principle states that programs, users, and even the systems be given just enough privileges to perform their task?
- (a) Principle of least privilege
 - (b) Principle of process scheduling
 - (c) Principle of operating system
 - (d) None of the mentioned
- (F) Which algorithm is defined in Time quantum?
- (a) Shortest job scheduling algorithm
 - (b) Round robin scheduling algorithm
 - (c) Priority scheduling algorithm
 - (d) Multilevel queue scheduling algorithm
- (G) What is Dispatch latency?
- (a) The speed of dispatching a process from running to the ready state
 - (b) Time of dispatching a process from running to ready state and keeping the CPU idle
 - (c) The time to stop one process and start running another one
 - (d) None of the mentioned

(H) What is waiting time?

- (a) The total time in the blocked and waiting queues
- (b) The total time spent in the ready queue
- (c) The total time spent in the running queue
- (d) The total time from the completion till the submission of a process

- 2. What is File Control Block? List and explain four items of metadata that you might find in a File Control Block (FCB).
- 3. What is a page fault? How is a page fault handled if it is triggered by a process issuing a write for which it has permission on a machine with ample free memory at the point the page fault occurs?
- 4. The operating system typically provides each process with the illusion that it runs in a contiguous piece of memory. State the problem of external fragmentation in memory where processes have variably sized memory partitions. Describe how paged virtual memory solves this problem, and any time and space costs it introduces.

- 5. Consider a simple operating system where live processes are either running, ready to run, or blocked on an event, before they exit.

(a) State four conditions under which the operating system will try to schedule processes.

(b) Differentiate between preemptive and non-preemptive scheduling. State the principal problem with non-preemptive schedulers.

- 6. Describe two alternative mechanisms that operating systems could use to reduce the opportunity for a user's process to access or corrupt the information being used by another user's process. In your descriptions include any hardware features that are relied upon.

7. Consider the following four processes to run in a single CPU. What is the average waiting time when scheduling these processes according to FCFS, SJF, and SRTF?

Process	Arrival Time	Burst Time
P1	0	8
P2	3	3
P3	5	4
P4	6	6

8. (a) Explain how the hardware and operating system support for paging combine to prevent one process from accessing another's memory.
- (b) Explain how space and time overheads arise from use of paging, and how the Translation Lookaside Buffer (TLB) mitigates the time overheads.

9. What is the difference between a logical or virtual memory address and a physical memory address? Consider a variable which is bound to a single logical address for the duration of process execution.
10. In relation to scheduling of processes, describe the concept of a working set and briefly outline how it can be used within an operating system. Briefly explain why context switching between processes is inherently more costly than switching between threads of a process.

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