

## B.Tech 5th Semester Exam., 2019

## OPERATING SYSTEMS

Time : 3 hours

Full Marks : 70

Instructions :

- (i) All questions carry equal marks.
- (ii) There are **NINE** questions in this paper.
- (iii) Attempt **FIVE** questions in all.
- (iv) Question No. 1 is compulsory.

1. Choose the correct answer from any seven of the following :

(a) What is operating system?

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- (i) Collection of programs that manages hardware resources
  - (ii) System service provider to the application programs

(g) The processes that are residing in main memory and are ready and waiting to execute are kept on a list called

(i) job queue

~~(ii) ready queue~~

(iii) execution queue

(iv) process queue

(h) Which of the following conditions is required for deadlock to be possible?

(i) Mutual exclusion

(ii) A process may hold allocated resources while awaiting assignment of other resources

(iii) No resource can be forcibly removed from a process holding it

~~(iv) All of the above~~

(i) Which one of the following is the deadlock avoidance algorithm?

~~(i) Banker's algorithm~~

(ii) Round-robin algorithm

(iii) Elevator algorithm

(iv) Karn's algorithm

(j) Physical memory is broken into fixed-sized blocks called

(i) frames

(ii) pages

(iii) backing store

(iv) None of the above

✓ 2. What is process control block? Explain it. Discuss the difference among short-term, medium-term and long-term scheduling.

3. Consider the following process :

Process	Arrival Time	Burst Time
P1	0.0	7
P2	2.0	4
P3	4.0	1
P4	5.0	4

Considering non-preemptive and preemptive SJF algorithm, find out average waiting time and average turnaround time in both cases.

4. What do you understand by race condition? Give few example of arising of race condition in concurrent processing.

✓ 5. (a) Define semaphore. Give a scheme for implementation of semaphore primitives.

(b) What do you mean by critical section problem? What is the solution to the critical section problem?

✓ 6. (a) What is a thread?

(b) How is thread different from a process?

(c) What resources are used when a thread is created?

7. How many page faults would occur for the following reference string for four page frames and three page frames using LRU and FIFO algorithms :

1, 2, 3, 4, 5, 5, 3, 4, 1, 6, 7,  
8, 7, 8, 9, 7, 8, 9, 5, 4, 5, 4, 2.

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8. Define deadlock. List four necessary conditions for occurrence of deadlock. A system contains six units of resource, and  $n$  processes that use the resource. What is the maximum value of  $n$  for which the system will be deadlock free if the maximum requirement of each process is 3?
9. Explain shortest-seek-time-first (SSTF) disk scheduling. Why SSTF scheduling tends to favour middle cylinders over the innermost and outermost cylinders?

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