

Branch: B.Tech. (Computer Engineering)

Sem: IV

Subject with Subject Code: Operating System| BTCOC403|

Marks:60

Date:- 30/11/2019

Time: 3 Hrs

Instructions to the Students:

1. Each question carries 12 marks.
2. Attempt any five questions of the following.
3. Illustrate your answers with neat sketches, diagram etc., wherever necessary.
4. If some part or parameter is noticed to be missing, you may appropriately assume it and should mention it clearly

Marks

Q.1 Attempt the following questions.

06

(A) Define operating system. Enlist and explain different types of os.

06

(B) List five services provided by an operating system, and explain how each creates convenience for users. In which cases would it be impossible for user-level programs to provide these services? Explain your answer.

Q.2 Attempt the following questions.

06

(A) Describe the actions taken by a kernel to context-switch between processes.

06

(B) Using the given information about the processes, calculate Average Waiting Time and Average Turnaround Time of each process under following scheduling algorithms:

- a) First Come First Served
- b) Shortest Job First
- c) Round Robin (With time slice of 5 ms)

Process	Burst time(ms)
P1	5
P2	24
P3	16
P4	10
P5	3

Q.3 Solve any Two.

(A) What is Inter-process communication? Are function callback and inter-process communication same?

06

- (B) Explain why interrupts are not appropriate for implementing synchronization primitives in multiprocessor systems. 06
- (C) What are the requirements for the solution to critical section problem? 06
- Q.4 Attempt the following questions.**
- (A) Consider the deadlock situation that could occur in the dining-philosophers problem when the philosophers obtain the chopsticks one at a time. Discuss how the four necessary conditions for deadlock indeed hold in this setting. Discuss how deadlocks could be avoided by eliminating any one of the four conditions. 06
- (B) What are the Conditions for Deadlock to occur? Briefly explain. In a system, the following state of processes and resources are given: $R_1 \rightarrow P_1$, $P_1 \rightarrow R_2$, $P_2 \rightarrow R_3$, $R_2 \rightarrow P_2$, $R_3 \rightarrow P_3$, $P_3 \rightarrow R_4$, $P_4 \rightarrow R_3$, $R_4 \rightarrow P_4$, $P_4 \rightarrow R_1$, $R_1 \rightarrow P_5$. Draw Resource Allocation Graph for the system and check for deadlock condition. Explain your answer. <https://www.batuonline.com> 06
- Q.5 Attempt the following questions.**
- (A) Given five memory partitions of 100 KB, 500 KB, 200 KB, 300 KB, and 600 KB (ill order), 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? 06
- (B) Compare the memory organization schemes of contiguous memory allocation, pure segmentation, and pure paging with respect to the following issues: 06
- External fragmentation
 - Internal fragmentation
 - Ability to share code across processes
- Q.6 Attempt the following questions.**
- (A) Consider a reference string: 4, 7, 6, 1, 7, 6, 1, 2, 7, 2. the number of frames in the memory is 3. Find out the number of page faults respective to: 06
- Optimal Page Replacement Algorithm
 - FIFO Page Replacement Algorithm
 - LRU Page Replacement Algorithm
- (B) In what situations would using memory as a RAM disk be more useful than using it as a disk cache? 06

*****End of Paper*****