

Reg No.: _____

Name: _____

APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY
FOURTH SEMESTER B.TECH DEGREE EXAMINATION(S), DECEMBER 2019

Course Code: CS204

Course Name: OPERATING SYSTEMS

Max. Marks: 100

Duration: 3 Hours

PART A

Answer all questions. Each carries 3 marks.

- | | | |
|---|--|---|
| 1 | Why does an Operating System require dual mode operations? | 3 |
| 2 | Write short notes on clustered systems | 3 |
| 3 | With the help of a suitable example, explain process creation. | 3 |
| 4 | Differentiate between Short term, Medium term and Long term schedulers | 3 |

PART B

Answer any two questions. Each carries 9 marks.

- | | | |
|---|--|---|
| 5 | a) Discuss any two Kernel Data structures | 4 |
| | b) Explain briefly any five services provided by an OS. | 5 |
| 6 | a) Explain the process of booting. | 5 |
| | b) What is context switch? Why context switch is considered to be an overhead to the system? | 4 |
| 7 | a) List out the List out the advantage of process cooperation | 3 |
| | How IPC using shared memory is implemented using Bounded buffer | 6 |

PART C

Answer all questions. Each carries 3 marks.

- | | | |
|----|---|---|
| 8 | What are the requirements to be satisfied by the solution to the critical section problem? | 3 |
| 9 | Explain Dining Philosophers problem. | 3 |
| 10 | Write any three criteria to be considered for comparing CPU scheduling algorithms? | 3 |
| 11 | What is the limitation of multilevel queue scheduling? How it is overcome in multilevel feedback queue scheduling | 3 |

PART D

Answer any two questions. Each carries 9 marks.

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|----|--|---|
| 12 | Define semaphore with its operations. What are the two types of Semaphores? | 9 |
| 13 | a) How indefinite blocking can be solved in priority scheduling | 3 |
| | b) Find the average waiting time for pre-emptive and non pre-emptive SJF scheduling for the following set of processes | |

Process	Arrival time	Burst time
P1	0	8
P2	2	4
P3	4	9
P4	5	5

6

14 Consider the following snapshot of a system

Process	Allocation	Max	Available
	A B C D	A B C D	A B C D
P0	0 0 1 2	0 0 1 2	1 5 2 0
P1	1 0 0 0	1 7 5 0	
P2	1 3 5 4	2 3 5 6	
P3	0 6 3 2	0 6 5 2	
P4	0 0 1 4	0 6 5 6	

Answer the following questions using Bankers algorithm

- What is the content of "*Need*" matrix? 2
- Is the system in a safe state? Justify your answer. 4
- If a request from P1 arrive for (0 4 2 0), can the request be granted immediately 3

PART E

Answer any four questions. Each carries 10 marks.

- Explain the concept of paging. 4
 - With the help of a diagram, explain logical address to physical address translation in paging. Illustrate with an example. 6
- Describe contiguous memory allocation. 5
 - Given six memory partitions of 300 KB, 600 KB, 350 KB, 200 KB, 750 KB, and 125 KB (in order), how would the first-fit, best-fit, and worst-fit algorithms place processes of size 115 KB, 500 KB, 358 KB, 200 KB, and 375 KB (in order)? Rank the algorithms in terms of how efficiently they use memory. 5
- Explain Optimal page replacement and LRU algorithms for page replacement 3
 - Find the number of page faults for the following page reference string with 3 page frames for Optimal page replacement and LRU algorithms. 7
2 3 4 2 1 3 7 5 4 3
- Explain "Elevator" algorithm for disk scheduling with example. 4
 - Total cylinders in a disk is 5000 [0-4999]. Header is at position 143; previous request is for 125, request queue is 86,1470, 913, 1774, 948, 1509, 1022, 1780, 130

- Find the seek time for
- (i) FCFS 3
 - (ii) SSTF 3
- 19 a) Briefly explain about file attributes 4
- b) Explain any two file allocation methods 6
- 20 a) Explain protection goals and principles of Operating System. 5
- b) How protection is implemented using access matrix? 5