

Reg No.: _____

Name: _____

APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY

B.Tech Degree S4 (S,FE) / S4 (PT) (S,FE) Examination May 2024 (2015 Scheme)

**Course Code: CS204****Course Name: OPERATING SYSTEMS (CS)**

Max. Marks: 100

Duration: 3 Hours

PART A*Answer all questions. Each carries 3 marks.*

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|---|----|---|---|
| 1 | a) | How does the distinction between kernel mode and user mode function as a basic form of protection system? | 3 |
| 2 | a) | Distinguish between the client-server and peer-to-peer models of distributed systems. | 3 |
| 3 | a) | Draw state diagram of a process. | 3 |
| 4 | a) | Compare process and thread. | 3 |

PART B*Answer any two questions. Each carries 9 marks.*

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|---|----|---|---|
| 5 | a) | What are the two fundamental approaches for users to interface with the operating system? Give Explanation. | 5 |
| | b) | Explain context switching with proper diagram. | 4 |
| 6 | | What are the functions of an operating system? | 9 |
| 7 | | What are the two major operations on processes? Explain. | 9 |

PART C*Answer all questions. Each carries 3 marks.*

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|----|--|---|---|
| 8 | | What is spinlock semaphore? How will it may overcome? | 3 |
| 9 | | Give requirements of a critical section problem. | 3 |
| 10 | | What are the scheduling criteria? | 3 |
| 11 | | What is the major problem with priority scheduling algorithms? Give its solution. | 3 |

PART D*Answer any two questions. Each carries 9 marks.*

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|----|--|--|---|
| 12 | | Explain the synchronization construct - monitor with proper diagram. | 9 |
| 13 | | Consider the following set of processes, with the length of the CPU burst given in milliseconds and all arrived at time 0 in the order P1, P2, P3, P4, P5. | |

Process	Burst Time	Priority
P1	2	2
P2	1	1
P3	8	4
P4	4	2
P5	5	3

- i) Draw Gantt charts that illustrate the execution of these processes using the following scheduling algorithms: FCFS, SJF, nonpreemptive priority (a larger priority number implies a higher priority), and RR (quantum = 2). 4
- ii) Calculate average waiting time of each of the above scheduling algorithms. 4
- iii) Which of the algorithms results in the minimum average waiting time (over all processes)? 1
- 14 Explain deadlock detection and recovery. 9

PART E

Answer any four questions. Each carries 10 marks.

- 15 a) Consider the following page reference string.
6,2,3,1,3,6,4,7,7,1,0,5,6,2,3,0,1,3,0,1
Assuming demand paging with three frames. How many page fault and page replacement will occur for the following page replacement algorithms? 6
- i) LRU ii) FIFO iii) Optimal
- Which page replacement algorithm have less page fault? 1
- b) What is a page fault in demand paging? 3
- 16 a) Explain Segmentation address translation with proper diagrams and example. 7
- b) Does segmentation suffer from fragmentation? Justify. 3
- 17 a) Explain thrashing with diagram. 4
- b) What are different dynamic memory allocation algorithms? Explain each with three memory partitions of 160K, 200K and 350K and processes of size 350K(P1), 50K(P2) and 100K(P3). 6
- 18 Suppose that a disk drive has 5000 cylinders, numbered 0 to 4999. The drive is currently serving a request at cylinder 2150, and the previous request was at cylinder 1805. The queue of pending requests, in FIFO order, is:
2069, 1212, 2296, 2800, 544, 1618, 356, 1523, 4965, 3681
Starting from the current head position, what is the total distance (in cylinders) 10

that the disk arm moves to satisfy all the pending requests for each of the following disk-scheduling algorithms?

- i) FCFS ii) SSTF iii) SCAN iv) LOOK

- 19 Explain different file allocation methods with proper diagrams. 10
- 20 a) What is the goal of protection? 4
- b) Explain how access matrix ensures protection. 6