Reg No.:_____ Name:_____

**APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY**

B.Tech Degree S4 (S, FE) / S4 (PT) (S, FE) Examination May 2023 (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.***

| | | | |
|---|---|---|---|
| 1 | a) | What is an Operating System (OS)? List any three functions of OS. | 3 |
| 2 | a) | Explain system call with an example. | 3 |
| 3 | a) | What is a Process Control Block ( PCB). | 3 |
| 4 | a) | Differentiate between single threaded and multi- threaded processes? | 3 |

## PART B

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

| | | | |
|---|---|---|---|
| 5 | a) | Differentiate between Monolithic and Micro kernel Design of OS | 6 |
| | b) | What are the three advantages of Multiprocessor Systems? | 3 |
| 6 | a) | List the criteria for CPU scheduling? Explain each. | 6 |
| | b) | What do you mean by context switching? Explain. | 3 |
| 7 | a) | Explain the different states of a process with a diagram. | 6 |
| | b) | What is the use of pipe in message passing? | 3 |

## PART C

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

| | | | |
|---|---|---|---|
| 8 | a) | Explain the wait and signal operations in Semaphore? | 3 |
| 9 | a) | What is a critical section? | 3 |
| 10 | a) | Explain pre-emptive scheduling with an example. | 3 |
| 11 | a) | What are the necessary conditions for deadlock to occur in a system? | 3 |

## PART D

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

| | | | |
|---|---|---|---|
| 12 | a) | Explain any three classical problems of synchronisation. | 9 |
| 13 | a) | Draw the Gantt Chart, find the average waiting time and average turnaround time of the following scheduling algorithms. i) SJF ii) Priority | 9 |

| Process | Arrival Time ( ms ) | Burst Time ( ms ) | Priority |
|---|---|---|---|
| P0 | 2 | 7 | 2 |
| P1 | 0 | 4 | 4 |
| P2 | 4 | 3 | 1 |
| P3 | 5 | 5 | 3 |

14 a) Explain deadlock avoidance using Banker's algorithm. 9

## PART E

***Answer any four questions. Each carries 10 marks.***

15 a) Explain the difference between internal and external fragmentation. 5

b) Explain the process of Swapping with a diagram. 5

16 a) Explain the concept of paging with a diagram. 10

17 a) Explain the following page replacement algorithms with an example. 10

i) LRU replacement

ii) FIFO replacement

iii) Optimal replacement.

18 a) What are the different file allocation methods? 10

19 a) Explain FCFS, SCAN and C-SCAN disk scheduling algorithms, using the given disk queue of requests: 98, 183, 37, 122,14,124,65 and 67. Assume that, the disk has 200 platters ranging from 0 to 199 and the current position of head is at cylinder 53. 10

20 a) How access matrix is used as a protection mechanism? 10