B　　　　　　　　　　**1100ITT303122101**　　　　　　　　　**Pages: 3**

Reg No.:_____　　　　　　　　Name:_____

APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY
Fifth Semester B.Tech Degree Examination December 2021 (2019 scheme)

Course Code: ITT303

Course Name: OPERATING SYSTEM CONCEPTS

Max. Marks: 100　　　　　　　　　　　　　　　　　　　　　　Duration: 3 Hours

PART A
(Answer all questions; each question carries 3 marks)　　　　　Marks

1	Explain the difference between kernel and shell.	3
2	Can the　　　*count= read(fd, buffer, n)*;　call return any value in count other than n? If so, why?	3
3	The long-term scheduler controls the degree of multiprogramming. Justify your answer.	3
4	How indefinite blocking is solved by priority scheduling?	3
5	What is race condition?	3
6	What are the necessary conditions for a deadlock situation?	3
7	Illustrate the difference between internal and external fragmentation.	3
8	Explain Belady's anomaly with an example.	3
9	What are the advantages of acyclic graph directory over tree structured directory?	3
10	How can bad blocks in disks be handled?	3

PART B
(Answer one full question from each module, each question carries 14 marks)

Module -1

11	a)	Explain basic functions of Operating System.	7
	b)	What is a system call? What are the different ways to pass parameters to system call? Explain basic types of system call with examples.	7
12	a)	Explain various Operating System structures.	8
	b)	What is an Operating System? Explain different types of Operating System.	6

Module -2

13	a)	What is Inter Process Communication? Explain how IPC performed by using shared memory and pipes.	8
	b)	What is Process Control Block ? Explain the fields in PCB.	6

14 a) Consider the following set of processes, with the length of the CPU burst time in given milliseconds.   10

Process	Arrival time	Burst time
P1	0	8
P2	4	9
P3	3	2
P4	5	5
P5	2	4

a) Draw Gantt chart to show execution using shortest remaining time first and Round robin (time quantum=4 ms) scheduling.

b) Calculate waiting time and turnaround time for each process in each scheduling algorithm.

c) Calculate average waiting time and turnaround time for each scheduling algorithm.

b) Explain the different states of a process with diagram.   4

Module -3

15 a) Explain different deadlock prevention methods.   7

b) What is semaphore? How producer consumer problem is solved using semaphore?   7

16 a) Explain how TestAndSetLock instruction solves mutual exclusion problem?   4

b) Consider the following snapshot of a system with five processes P1, P2, P3, P4, P5 and four resources A,B,C and D   10

Process	Allocation				MAX			
	A	B	C	D	A	B	C	D
P1	0	0	1	2	0	0	2	3
P2	1	0	0	1	1	6	4	2
P3	1	2	4	2	2	3	6	5
P4	0	5	1	1	0	6	2	5
P5	0	0	1	2	1	6	5	3

Available

A	B	C	D
1	3	2	2

Using Banker's algorithm, answer the following questions:-

i) How many resources of type A, B, C, D are there?

ii) What are the contents of need matrix?

iii) Find if the system is in safe state? If it is, find the safe sequence.

Module -4

17 a) Consider six memory partitions of size 200 KB, 450 KB, 500 KB, 600 KB,   6
300 KB and 250 KB. These partitions need to be allocated to four processes
of sizes 347 KB, 190 KB, 468 KB and 475 KB in that order. Perform the
allocation of processes using First Fit Algorithm, Best Fit Algorithm and
Worst Fit Algorithm. Which algorithm makes the most efficient use of
memory?

  b) With the help of an example explain the concept of paging. How it differ from   8
segmentation?

18 a) Explain how address translation is done in segmentation.   5

  b) Consider a main memory with four page frames and the following sequence   9
of page references: 3, 8, 2, 3, 9, 1, 2, 6, 3, 8, 9, 3, 6, 2, 1. Find the number of
page faults for the following page replacement policies.

      a) First-In-First-out (FIFO)

      b) Optimal

      c) Least Recently Used (LRU)

Module -5

19 a) Consider a disk queue with requests for I/O to blocks on cylinders 55, 68,   8
183, 39, 18, 190, 160, 150, 98. The cylinders are numbered from 0 to 199.
The head is initially at cylinder number 65. Find the total head movement (in
number of cylinders) incurred while servicing the requests using FIFO, SSTF
and SCAN algorithm (Assuming that the disk arm is moving toward 199).

  b) Explain different file access methods.   6

20 a) Explain indexed and linked file allocation methods with neat diagram.   8

  b) Explain different ways in which directory can be implemented.   6

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Inter-process communication (IPC) is a mechanism that allows processes to communicate with each other and synchronize their actions.