University Roll No. 2123457061

Master of Computer Applications
Subject:- Operating Systems
Paper Code: MCAC-304
Unique Paper Code: 223401304
Semester III
December-2022
Year of admission: 2021-22

Time: Three Hours **Max. Marks: 70**

Note: All questions are compulsory. Q1 carries 20 marks, Q2 to Q6 carries 10 marks each.

Q1. Distinguish between the following with the help of the suitable examples: (5×4)

A) execl() and execv()
B) wait() and waitpid()
C) kill(), exit() and _exit()
D) SCAN and C-SCAN //Disk scheduling algorithms
E) setpgid(), setpgrp() and setsid()

Q2. (i) What is Belady's anomaly? Consider the memory of 3 frames and 4 frames, respectively, and discuss the number of page faults for both frame sizes with the help of the given reference string. 0 1 2 3 0 1 4 0 1 2 3 4 (6)

Q2. (ii) Discuss the process creation and process termination related system calls. (4)

Q3 (i) Consider a logical address space of 128 KB mapped onto a physical memory of 64KB where the size of a page is 2 bytes. Find the size of p,d in logical address. Also, find the size of the physical address. (where p and d are page number and page offset, respectively.) (6)

Q3. (ii) Discuss the steps to serve the page fault in demand paging. (4)

Q4 (i) Consider the set of 5 processes whose arrival time and burst time are given below-

Process Id	Arrival time	Burst time
P1	2	2
P2	1	4
P3	4	2
P4	0	8
P5	3	4

Calculate the average waiting time and average turnaround time for the CPU scheduling algorithms: Shortest Job First (SJF) and Shortest Remaining Time First (SRTF). (6)

Q4 (ii) Write a code snippet to copy the contents of one file to another file using system calls. (4)

Q5 (i) Explain Bounded-Buffer solutions of Producer-consumer problem (both solutions (n-1) & n slots utilization). (6)

Q5 (ii) Write a code snippet for creating multiple threads using pthread library.

(4)

Q6 (i) Assume a system has a logical address of 16 bits. It has a 32MB physical memory. It also has a 2-byte page size. How many entries are in an inverted page table? Also, show the advantages and disadvantages of the inverted page table.

(6)

Q6 (ii) Show the signature of open() and creat() system calls. And discuss the scenario when open() system call works like the creat() system call. (4)

1 byte = 16 bits

$= 2^{11}$

$= 2^6$ KB