University of Engineering & Management, Kolkata

Term - I Examination, August - September, 2021

Programme Name: B.Tech in Computer Science **Semester: 5th**

Course Name: Operating Systems

Course Code: PCCCS501

Full Marks: 100 **Time: 3 hours**

GROUP A (20 Marks)

Answer the following questions. Each question is of 2 marks.

1.

i. List the difference between hard real time & soft real time?
ii. "DOS is an example of monolithic architecture"-- Explain.
iii. Describe about the I/O bound process?
iv. Is it possible to have preemptive version of FCFS?
v. Explain what is aging?—describe.
vi. Explain what is mounting?
vii. Explain sequential file access.
viii. List the disadvantage of contiguous memory allocation?
ix. List the different layers of file-system architecture.
x. Explain how FAT is advantageous over linked list allocation?

GROUP B (30 Marks)

Answer the following questions. Each question is of 5 marks.

2. Describe the importance of PCB in controlling context switching of a process.
3. Describe different types of events in context of operating system.
4. Illustrate in UNIX, which system call creates the new process and how.
5. A. Illustrate the output of the following code snippet--

```
int main()
{
fork();
fork();
```

```
printf("hello\n");

return 0;
}
```

OR

B. "Operating Systems operates in two different modes" –explain.

6. A. "Operating Systems provides hardware abstraction"---explain.

OR

B. "For efficient process management CPU utilization, throughput must be maximized, and turn around, waiting and response time must be minimized". Illustrate the concepts.

7. A. Discuss attributes of a File.

OR

B. Define and explain Disk Response time and Transfer time.

GROUP C (50 Marks)

Answer the following questions. Each question is of 10 marks.

8. Differentiate between long term, short term and medium term process scheduling.

9. Illustrate different scenarios in which context switching can happen with suitable example.

10. A. Consider the following scenario of processes with time quantum = 4; Draw the Gantt chart for the execution of the processes, showing their start time and end time using SJF and RR scheduling strategies. Calculate turnaround time and response time for each process for both the scheduling strategies. Also calculate average waiting time for the system for both the scheduling strategies.

Process	Arrival Time	Execution Time
P1	0	18
P2	1	3
P3	2	4
P4	3	5
P5	4	3

OR

B. "Operating system has two separate stacks, one for user and another for kernel"—illustrate the advantage and disadvantage? Differentiate between process moving from Running state to Ready state and Running state to Blocked state.

11. A. Assume that following processes are arriving in the order: P3, P3 and P1.Find out average waiting times and turnaround times after FCFS scheduling and SJF (non-preemptive) of the processes. Also draw Gantt chart for the scheduling also.

Process	**Burst Time**
P_1	26
P_2	3
P_3	3

OR

B. Given a hard disk of 200 tracks (Track 0-199) with Track 0 being the innermost track. Write down the track numbers the disk head will travel for the following 5 disk scheduling algorithms with the following sequence of disk track requests: 103, 110, 95, 130, 143, 55, 50, 147, 40. The disk head has just finished a request at track 105 and is currently at track 100. For this exercise, which disk-scheduling algorithm (FIFO, SSTF, SCAN, C-SCAN) is most effective?

12. A. The linked file allocation eliminates the drawbacks of the contiguous file allocation. However, the linked allocation may consume more time as compared to the contiguous allocation. How can it be improved? What can be the worst case in the performance of a system in the indexed file allocation?

OR

B. The index node (inode) of a Unix-like file system has 12 direct, one single-indirect and one double-indirect pointers. The disk block size is 4 kB, and the disk block address is 32-bits long. The maximum possible file size is (rounded off to 1 decimal place) _____ GB

****