Master of Computer Applications

MCAC304:OPERATING SYSTEMS

Unique Paper Code: 223401304
Semester III
OBE Examination, Nov./Dec.-2021
Year of Admission: 2020

Time: Three Hours | Max. Marks: 70

Note: Answer any 4 questions. All questions carry equal marks.

Q1 (A) Consider the following page reference string:

4, 2, 6, 1, 2, 4, 2, 5, 1, 7, 2, 1, 0, 5

Assuming demand paging with three frames, how many page faults will occur for the following replacement algorithms?

(i) LRU Replacement

(ii) FIFO Replacement

(B) What is page fault, TLB hit and TLB miss?

Q2 (A) Is this possible that resource allocation graph has a cycle but no deadlock? Justify your answer with the help of a resource allocation graph having cycle.

Q2 (B) Explain Tree Structured and Acyclic Graph Directories along with appropriate diagrams.

Q3 Write short notes on

(A) Layered Approach of OS Design

(B) System Calls

(C) Internal and external fragmentation

(D) **Convoy Effect** in CPU Scheduling

(E) Long-term, Medium-term and short-term scheduler

Q4 (A) What is race condition in process synchronization? Explain race condition with the help of producer and consumer problem.

(B) What will be the output of the following code segment? Justify your answer.

```
int main() {
fork();
fork();  fork();
printf("OS\n");
return 0;
}
```

Q5 Consider following set of processes:

Process	Arrival Time	Burst Time	Priority
P_1	0	5	2
P_2	2	6	1
P_3	5	8	3
P_4	6	7	4
P_5	7	4	5 (Highest)

(A) Draw Gantt chart for SJF algorithm and calculate turnaround time for every process.

(B) Draw Gantt chart for Priority based algorithm (preemptive) and calculate waiting time for every process.

Q6 (A) Consider a logical address space of 32 pages with 4-KB frame size mapped onto a physical memory of 512 KB. What is the breakup of offset and page number in the logical address and physical addresses?

(B) Suppose a disk drive has 200 cylinders numbered from 0 to 199. The request for 86 is being serviced and is moving towards track 199 and the disk request queue contains read/write requests for the sectors on tracks 21, 128, 141, 96 and 189, respectively. What is the total number of head movements needed to satisfy the requests in the queue using:

(i) FCFS
(ii) SCAN