UEM

University of Engineering & Management, Kolkata

1st Term Examination, March, 2019

Course: B.Tech(CSE) Semester: 6th

Paper Name: Operating Systems

Paper Code: CS603

Full Marks: 50 **Time: 1 hour 30 minutes**

Group-A (10 marks)

Answer any 5. Each question is of 2 marks.

1. A) "Operating system manages resources"—explain
   B) "Operating system has two separate stacks, one for user and another for kernel"—illustrate the advantage?
   C) In Unix, Which system call creates a new process?
   D) Applications like Banking and railway reservation system require which type of OS?
   E) State the main difference between logical from physical address space.
   F) How does swapping result in better memory management?
   G) What are overlays?

Group-B (10 marks)

Answer any 2. Each question is of 5 marks.

2. What are the difference between process moving from Running state to Ready state and Running state to Blocked state.
3. The working of an Operating System is event driven-explain
4. Explain different scenarios of context switching in detail
5. What is dynamic loading? What is Demand Paging? **2.5+2.5**
6. Consider six memory partitions of size 200 KB, 400 KB, 600 KB, 500 KB, 300 KB, and 250 KB, where KB refers to kilobyte. These partitions need to be allotted to four processes of sizes 357 KB, 210 KB, 468 KB and 491 KB in that order. If the best fit algorithm is used, which partitions are NOT allotted to any process?

Group-C (30 marks)

Answer any 2. Each question is of 15 marks.

7. Describe PCB. Explain the process lifecycle with a suitable diagram. Write down the differences between fork() and exec(). **(5+5+5)**

8. Define throughput, CPU utilization, turnaround time, waiting time and response time. Assume that following processes are arriving in the order: P2, P3, and P1. Find out average waiting

time after FCFS, SJF scheduling of the processes. Also draw Gantt chart for the scheduling also

Process	Burst Time
P1	24
P2	3
P3	3

(5+10)

9. Define external fragmentation. What are the causes for external fragmentation? Differentiate between internal and external fragmentation.

Consider a memory-management system based on paging. The total size of the physical memory is 2GB, laid out over pages of size 8KB. The logical address space of each process has been limited to 256 MB.

a) Determine the total number of bits in the physical address.
b) Determine the number of bits specifying page replacement and number of bits for page frame number.
c) Determine the number of page frames.
d) Determine the logical address layout.

(2+2+3+8)

10. Consider the reference string for different page replacement algorithm:
7, 0, 1, 2, 0, 3, 0, 4, 2, 3, 0, 3, 2, 1, 2, 0, 1, 7, 0, 1
(Assume frame size = 3)

a) If FIFO page replacement policy is used then the percentage of page fault is _____.
b) If optimal page replacement policy is used then the percentage of page fault is _____.
c) If LRU page replacement policy is used then the percentage of page fault is _____.

(5+5+5)

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