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34096

BT-4/M-20
OPERATING SYSTEMS
CSE-210N

Time : Three Hours] [Maximum Marks : 75

Note: Attempt *Five* questions in all, selecting at *least* one question from each Unit. All questions carry equal marks.

Unit I

1. (a) Justify the need of I/O structure and storage hierarchy in a computer system. **5**

(b) Discuss the roles of using systems calls and system programs for the effective implementation of operating systems services modules. **5**

(c) Why it is always beneficial to use various types of protection by the operating systems ? **5**

2. (a) Briefly discuss the following : **7.5**

(i) Real time computing

(ii) Batch Processing

(b) What are the various system devices that are ordered by the operating systems ? Comment on the need of these system services. **7.5**

Unit II

3. (a) Explain the following CPU scheduling algorithms :

(i) SJF **2.5**

(ii) FCFS **2.5**

(iii) Round Robin. **2.5**

(b) Write and explain the Dining Philosophers Problem. Also, provide the solution for the problem using semaphores. **7.5**

4. (a) Explicate the classical problem of synchronization. Discuss the role of hardware and software support which are involved in synchronization. **5**

(b) How non-preemptive scheduling works? Briefly explain. **5**

(c) Draw and explain the flow of process management activity that takes place during co-operating processes and inter process communication. **5**

Unit III

5. (a) What is a page-fault ? List all the steps of how a page-fault is serviced by the operating system ?

(b) Define paging and fragmentation. The following is the sequence of page requests : 1, 2, 5, 3, 4, 3, 2, 5, 4, 2, 1, 1. Assume that there are three frames. Now, how many page faults will occur if MFU and LRU algorithms are used to replace pages ?

6. (a) Explain the Dual-mode operation of an operating system. Explain contiguous memory allocation and linked allocation methods with the help of suitable working diagram. **8**

(b) Explain and justify the roles of the following :

(i) Paged segmentation **3.5**

(ii) Recovery from deadlock **3.5**

Unit IV

7. (a) Draw the Gantt chart for the SSTF and FCFS scheduling policies and calculate the turnaround time, average turnaround time, waiting time, average waiting time, throughput and processor utilization for the following set of processes that arrive at a given arrival time shown in the table by applying SSTF and FCFS. **10**

Process	Arrival Time	Processing Time (Milliseconds)
P1	0	3
P2	1	5
P3	2	5
P4	3	5
P5	4	6
P6	5	4

(b) Explain the Non-continuous (indexing and chaining) disk space management methods. **5**

8. (a) Explain the following security models :

(i) Mandatory Access Control **2.5**

(ii) Rule Based Access Control **2.5**

(iii) Discretionary-Access Control **2.5**

(b) Justify the roles of the following with concern to the kernel I/O subsystem :

(i) Scheduling **2.5**

(ii) Caching **2.5**

(iii) Spooling **2.5**