

CBCS SCHEME

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21CS44

Fourth Semester B.E. Degree Examination, June/July 2023 Operating System

Time: 3 hrs.

Max. Marks: 100

Note: Answer any FIVE full questions, choosing ONE full question from each module.

Module-1

- 1 a. With neat diagram, explain :
i) Operating System ii) Dual Mode Operation in O.S. (08 Marks)
b. Explain the Operating System services with respect to programs and the users. (06 Marks)
c. What is a Process? Explain different states of a process with state diagram. (06 Marks)

OR

- 2 a. With neat diagram, explain the concept of Non virtual machine, Virtual machine and VMware architecture. (10 Marks)
b. Define : i) Context switching ii) Direct and Indirect communication
iii) Automatic and Explicit buffering. (10 Marks)

Module-2

- 3 a. What is Multithreaded process? Explain four benefits of Multithreaded programming. (06 Marks)
b. Consider the set of process with Arrival time, CPU burst time (in milliseconds) and priority shown below (Lower number represents higher priority).

Process	Arrival Time	Burst Time	Priority
P1	0	10	3
P2	1	1	1
P3	2	2	4
P4	3	1	5
P5	4	5	2

Write the Gantt chart and solve the Average waiting time and Average turnaround time for
i) SJF Scheduling (Preemptive) ii) Priority Scheduling (Preemptive).

(NOTE : Consider Arrival Time for both Algorithms).

(14 Marks)

OR

- 4 a. Explain with diagram : i) Multithreading models ii) Multilevel queue scheduling. (08 Marks)
b. What is Critical – Section? How do you implement a monitor solution to the dining – philosophers problem? (12 Marks)

Module-3

- 5 a. What is a Deadlock? What are the four necessary conditions for the deadlock to occur? (04 Marks)
b. What are the two methods to eliminate deadlock? (02 Marks)

- c. Consider the following snapshot of a system :

Process	Allocation				Max				Available			
	A	B	C	D	A	B	C	D	A	B	C	D
P1	2	0	0	1	4	2	1	2	3	3	2	1
P2	3	1	2	1	5	2	5	2				
P3	2	1	0	3	2	3	1	6				
P4	1	3	1	2	1	4	2	4				
P5	1	4	3	2	3	6	6	5				

Answer the following using Banker's algorithm.

- Is the system is in safe state? If so, what is the safe sequence?
- If request from process P2 (0, 1, 1, 1) is considered immediately, what is the System state and Sequence? (14 Marks)

OR

- Which are the commonly used strategies to select a free hole from the available holes? (06 Marks)
- With suitable diagram, explain external fragmentation. (04 Marks)
- With neat diagram, explain paging hardware with TLB. (10 Marks)

Module-4

- What is Demand Paging? Explain the steps in handling page fault using appropriate diagram. (10 Marks)
- Consider the page reference string : 7, 0, 1, 2, 0, 3, 0, 4, 2, 3, 0, 3, 2, 1, 2, 0, 1, 7, 0, 1 for a memory with 3 frames. Determine the number of page faults using Optimal and LRU replacement algorithms. Which algorithm is most efficient? (10 Marks)

OR

- With neat diagram, explain Two – level and Three – level directory structure. (08 Marks)
- Explain Contiguous and Linked disk space allocation methods with diagram. (12 Marks)

Module-5

- A drive has 200 cylinders 0 to 199. Head starts at 53 to serve the request queue : 98, 183, 37, 122, 14, 124, 65, 67. Draw disk head schedule diagram and explain for FCFS , SSTF, C – SCAN and C – LOCK. (12 Marks)
- How the Access matrix model of protection can be viewed in OS? (08 Marks)

OR

- With neat diagram, explain SAN and MULTICS. (08 Marks)
- Explain the components of a Linux System. (06 Marks)
- Explain in brief fork () and exec () system calls in Linux / UNIX OS, also write a program to implement these system calls in C language. (06 Marks)
