

CBCS SCHEME

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21CS44

Fourth Semester B.E. Degree Examination, Dec.2023/Jan.2024

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. Define Operating System. Explain the role of operating system with respect to user view and system view. (06 Marks)
- b. With a neat diagram, explain dual mode operation. (06 Marks)
- c. Briefly explain the services provided by the operating system that are helpful to the user. (08 Marks)

OR

- 2 a. Define process. Explain the different characteristics of scheduling criteria. (06 Marks)
- b. Differentiate between long term and short term schedulers. (04 Marks)
- c. Define IPC. Explain shared memory and message passing mechanisms. (10 Marks)

Module-2

- 3 a. With a neat figure, discuss various multi-threaded models. (06 Marks)
- b. List out different threading issues. Explain any two. (06 Marks)
- c. Consider the following set of processes.
 - i) Draw the Gantt chart showing the execution of these processes using non-preventive SJF and SRTF scheduling algorithms.
 - ii) Compute turn around time and waiting time.
 - iii) Compute the average turn around time and average waiting time.

Process	Arrival time	Burst time
P ₁	0	8
P ₂	1	4
P ₃	2	9
P ₄	3	5

(08 Marks)

OR

- 4 a. What are the three requirements to be met by a solution to the critical section problem? Explain. (06 Marks)
- b. Briefly discuss monitor solution to the dining philosopher problem. (08 Marks)
- c. Write a short note on semaphores. (06 Marks)

Module-3

- 5 a. Define deadlock. Explain the necessary conditions to arise deadlock. (06 Marks)
- b. Consider the following snapshot of a system.

	Allocation			Maximum			Available		
	A	B	C	A	B	C	A	B	C
P ₀	0	1	0	7	5	3	3	3	2
P ₁	2	0	0	3	2	2			
P ₂	3	0	2	9	0	2			
P ₃	2	1	1	2	2	2			
P ₄	0	0	2	4	3	3			

Answer the following question using Bankers Algorithm.

- i) Is the system in a safe state?
- ii) If a request from P₁ arrives (1, 0, 2) can the request be granted immediately. (10 Marks)
- c. "A safe state is not deadlock state but a deadlock state is an unsafe state". Explain. (04 Marks)

OR

- 6 a. With a neat diagram, explain paging hardware with TLB. (08 Marks)
 b. Define address binding explain multi-step processing of a user program. (06 Marks)
 c. Given five memory positions of 100 KB, 500 KB, 200 KB, 300 KB and 600 KB (in order), how would the first fit, best fit and worst-fit algorithms place processes of 212 KB, 417 KB, 112 KB and 426 KB (in order)? Which algorithm makes the most efficient use of memory? (06 Marks)

Module-4

- 7 a. Define demand paging. With a neat diagram explain the steps in handling page fault. (08 Marks)
 b. Consider the following page reference string
 1, 2, 3, 4, 2, 1, 5, 6, 2, 1, 2, 3, 7, 6, 3, 2, 1, 2, 3, 6
 How many page faults would occur for the LRU, FIFO and optimal page replacement algorithms? Assume frame size is 3. (12 Marks)

OR

- 8 a. Define file. Explain different operations can be performed on the file. (07 Marks)
 b. Explain different file access methods. (09 Marks)
 c. List out different allocation methods. Explain any one. (04 Marks)

Module-5

- 9 a. Suppose that a disk has 5000 cylinders numbered 0 to 4999. The drive is currently serving a request at cylinder 143 and the previous request was at cylinder 125. The queue of pending requests, in FIFO order is,
 86, 1470, 913, 1774, 948, 1509, 1022, 1750, 130
 Starting from the current head position, what is the total distance (in cylinders) that the disk arm moves to satisfy all the pending requests for each of the following disk-scheduling algorithms?
 i) FCFS ii) SSTF iii) SCAN iv) LOOK (12 Marks)
 b. Write a short note on Access Matrix. (08 Marks)

OR

- 10 Write a short note on the following :
 a. Components of Linux system
 b. Process Management
 c. File System
 d. Interprocess communication (20 Marks)
