CBCS SCHEME

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17CS64

Sixth Semester B.E. Degree Examination, Dec.2023/Jan.2024
Operating Systems

Time: 3 hrs. Max. Marks: 100

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

Module-1

1 a. What is Operating System? What are its goals? Discuss its roles from different perspectives. **(10 Marks)**

b. List out three main advantages of multi processor system. Distinguish between symmetric and asymmetric multiprocessing. **(10 Marks)**

OR

2 a. What is a process? Draw and explain the process state diagram. **(10 Marks)**

b. Explain the implementation of inter process communication using shared memory and message passing. **(10 Marks)**

Module-2

3 a. What is a thread? What is the need for multithreaded processes? Explain 3 models of multithreaded programming. **(10 Marks)**

b. What is semaphore? How it can be used to solve mutual exclusion problem? Give solution to bounded buffer problem using semaphore. **(10 Marks)**

OR

4 a. What are the necessary and sufficient conditions for deadlocks? Briefly explain. **(10 Marks)**

b. Define Dining Philosopher's problem and give solution for the same using monitor. **(10 Marks)**

Module-3

5 a. Describe a resource allocation graph
i) With a deadlock
ii) With a cycle but no deadlock. **(08 Marks)**

b. Determine whether the following system is in safe state by using Banker's algorithm.

Process	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			

If a request for P_1 arrives for (1 0 2), can the request be granted immediately? **(12 Marks)**

OR

6 a. Explain in detail internal and external fragmentations. How these problems are overcome? **(10 Marks)**

b. With an example, explain the concept of paging in paging what is the worst case and avg internal fragmentation per process. **(10 Marks)**

Module-4

7 a. What is virtual memory? How can it be implemented? What are its benefits? **(10 Marks)**

b. Explain: i) Demand paging ii) Dynamic linking iii) Copy-on-write iv) Thrashing. **(10 Marks)**

OR

8 a. List and explain different file types, file attributes and file operations. **(10 Marks)**

b. Explain different types of directory structures with examples and their advantages and disadvantages. **(10 Marks)**

Module-5

9 a. Explain contiguous allocation of disk space methods. **(08 Marks)**

b. Describe Bit vector and linked list, grouping approaches to managing free space on a disk. **(06 Marks)**

c. What is a boot block and bad block? Explain the techniques used for handling bad blocks. **(06 Marks)**

OR

10 a. Define the following terms with ref to scheduling:
i) Constant Linear Velocity (CLV)
ii) Constant Angular Velocity (CAV)
iii) Seek time
iv) Rotational latency. **(10 Marks)**

b. Explain the following disk scheduling in brief with examples:
i) FCFS ii) SSTF iii) SCAN iv) LOOK. **(10 Marks)**

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