Sl. No.

B1.4-R5 : OPERATING SYSTEMS

NOTE :
1. **Answer question 1 and any FOUR questions from 2 to 7.**
2. **Parts of the same question should be answered together and in the same sequence.**

Total Time : 3 Hours   **Total Marks : 100**

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1. (a) How will you differentiate between Internal and External Fragmentation?

(b) What is the critical section problem ? How is it handled ?

(c) Explain clustered and time sharing operating systems.

(d) Difference between Embedded and Real Time Operating System.

(e) Why is virtual memory concept used ? Explain with an example.

(f) What is a network operating system ? Write down its two main functionalities over a stand-alone system.

(g) Differentiate between Pre-emptive and Non-preemptive scheduling algorithms.

(7x4)

2. (a) Suppose a system is running too many I/O Jobs. What will be its effect on the system Performance ?

(b) In a virtual memory system, the size of the virtual address is 32-bit, size of physical address is 30-bit, page size is 4 Kbyte and size of each page table entry is 32-bit. The main memory is byte addressable. What is the maximum number of bits that can be used for storing frames and other information in each page table entry ?

(c) Differentiate between Short term, Medium term and Long term scheduling.

(6+4+8)

3. (a) What is Belady's Anomaly ? Explain with the help of a suitable example.

(b) What is page fault ? Compute the number of page faults using LRU and FIFO algorithms with 4 frames for the given page reference string: 1, 2, 3, 4, 1, 2, 5, 1, 2, 3, 4, 5.

(c) Distinguish between the client-server and peer-to-peer models of distributed systems.

(6+6+6)

4. (a) What is the motivation of introducing multilevel feedback queue ? What are the merits and demerits of multilevel feedback queue scheduling ?

(b) Explain Rate - monotonic scheduling algorithm with the help of a suitable example.

(c) What are the scheduling objectives ?

((2+4)+8+4)

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5. (a) What are necessary conditions for deadlock ?

(b) What is deadlock avoidance ? Write Banker's algorithm for deadlock avoidance.

(c) Consider the following snapshot of a system :

Process No.	Allocation			Max			Available		
	A	B	C	A	B	C	A	B	C
P0	0	3	0	7	5	3	2	1	0
P1	3	0	2	3	2	2			
P2	3	0	2	9	0	2			
P3	2	1	1	2	2	2			
P4	0	0	2	4	3	3			

(i) Find the current need matrix.

(ii) Is the system in safe state ? **(3+5+10)**

6. (a) What are the important tasks to be performed by a distributed OS ?

(b) To protect the features of the distributed systems, some design issues must be implemented. Write down the design issues briefly.

(c) In a distributed system, various processors execute several processes, but to maximize the performance of the system, there must be balanced distribution of the computational load. What are the different issues faced while implementing distributed process scheduling ? **(6+4+8)**

7. (a) Explain in detail the mechanism of public-key encryption and private key encryption.

(b) Write down the steps performed during user authentication. Explain the different types of passwords used for user authentication.

(c) Could a RAID level 1 organization achieve better performance for read requests than a RAID level 0 organization with non redundant striping of data ? If so, how ? **(6+6+6)**

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