

(Lib)

Operating System (3 Hours)

[Total Marks : 100

N.B.:

- (1) Question No. 1 is compulsory.
 (2) Out of remaining questions, attempt any **four** questions.
 (3) Assume **suitable** data wherever required but **justify** the same.
 (4) **All** questions carry **equal** marks.
 (5) Answer to **each** new question to be started on a **fresh** page.
 (6) **Figure** to the **right** in brackets indicate **full** marks.

1. (a) Draw the architecture of RTOS and explain the function of each block the same. (10)
 (b) What are the various system calls for Process Management? Explain each one with their syntax. (10)
2. (a) What is process and threads? How and where we can use them? (10)
 (b) Explain various page replacement policies. Implement LRU, OPT, FIFO for the page frame sequence 0, 1, 2, 1, 4, 2, 3, 7, 2, 1, 3, where page frame size is 3. Also calculate the hit ratio. (10)
3. (a) What is DMA? What are the different ways in which DMA is performed? Explain each one of them briefly. (10)
 (b) What are the various file structures? Explain each one in detail. (10)
4. (a) Explain the Shortest Seek first disk scheduling algorithm with an example. What are the drawbacks of this algorithm? What are the techniques used to alleviate these drawbacks. (10)
 (b) What is the virtual memory? Explain with neat diagram the translation of virtual address into physical address in a segmentation/paging system. (10)
5. (a) What are the four conditions that create deadlock? Explain deadlock prevention and avoidance techniques. (10)
 (b) Why there is need for communication between two processes? Explain various modes of communication. (10)
6. (a) What is buffering? Why there is a need of Buffering while performing I/O? Explain Double Buffering with an example. (10)
 (b) Explain how file-systems store files in a linked-list fashion. What are the limitations and advantages of this approach? (05)
 (c) Explain the shared OS configuration for multiprocessor systems. Give an example of a real-world kernel which uses this configuration. (05)

7. Write Short note on (any four).

(20)

- (a) Applications of RTOS
 - (b) Comparison of any two RTOS
 - (c) Monolithic Vs Micro Kernels.
 - (d) System Calls for Directory Handling
 - (e) Resource Graph Models
 - (f) Inode or FAT Structure
-