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JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY, WAKNAGHAT

TEST -3 EXAMINATIONS- 2026

B.Tech-II Semester (CSE/IT/BT/ECE/CE)

COURSE CODE (CREDITS): 18B11CI411 MAX MARKS: 35

COURSE NAME: OPERATING SYSTEMS

COURSE INSTRUCTOR:Ruchi Verma MAX. TIME: 2 Hours

Note: *(a) All questions are compulsory.*

(b) The candidate is allowed to make Suitable numeric assumptions wherever required for solving problems

(c) Use of calculator is not allowed

Q.No	Question	CO	Marks
Q1	**Assessment-Based Questions** 5*1 marks=5 marks a. Differentiate between internal fragmentation and external fragmentation with one suitable example for each. b. What is the significance of the dirty bit in virtual memory management? c. Define locality of reference. Why is it important in demand paging? d. What is the role of an interrupt handler in I/O operations? e. Differentiate between SCAN and CSCAN disk scheduling algorithms.	CO2	5
Q2	**Numerical Based Questions** 2* 3marks=6 marks a. A disk queue contains requests for cylinders in the following order: 95, 180, 34, 119, 11, 123, 62, 64 The initial head position is 50. Calculate the total head movement using: FCFS SSTF SCAN b. Consider the reference string: 1, 2, 3, 4, 2, 1, 5, 2, 4, 5, 3, 2 Using **FIFO** and **LRU** page replacement algorithms with **3 page frames**, calculate the number of page faults.	CO3	6
Q3	**Critical Thinking Questions** 5*3 marks=15 marks a. Explain contiguous memory allocation. Discuss how	CO4	15

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	compaction helps in overcoming external fragmentation. Mention its limitations. b. Explain the paging mechanism with the help of logical-to-physical address translation. Discuss protection and sharing in paging systems. c. Discuss demand paging in detail. Explain the sequence of steps performed by the operating system during page fault handling. d. Explain the architecture of I/O hardware. Differentiate between programmed I/O, interrupt-driven I/O, and DMA. e. Explain directory structure and file system structure in operating systems. Compare linear list and hash table implementations of directories.		
Q4	Explain free-space management techniques in file systems. Compare: • Bit vector method • Linked list method • Grouping method Also discuss how directory implementation using linear lists and hash tables affects efficiency and performance.	CO2	5
Q5	2*2= 4marks a. Explain contiguous memory allocation. Differentiate between fixed partitioning and variable partitioning with suitable examples. b. Discuss paging and explain the hardware support required for paging. Also mention any two disadvantages of paging.	CO4	4

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