

## JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY, WAKNAGHAT

TEST -3 EXAMINATION- December, 2017

B.Tech/ 5<sup>th</sup> Semester

COURSE CODE: 10B11CI511

MAX. MARKS: 35

COURSE NAME: OPERATING SYSTEM

COURSE CREDITS: 03

MAX. TIME: 2Hrs

*Note: All questions are compulsory. Carrying of mobile phone during examinations will be treated as case of unfair means.*

**Section A: Each question carries three marks**

1. Explain the difference between internal and external fragmentation.
2. Compare paging with segmentation with respect to the amount of memory required by the address translation structures in order to convert virtual addresses to physical addresses.
3. Given five memory partitions of 100 KB, 500 KB, 200 KB, 300 KB, and 600 KB (in order), how would each of 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?
4. Consider the following segment table:

Segment	Base	Length
0	219	600
1	2300	14
2	90	100
3	1327	580
4	1352	96

What are the physical addresses for the following logical addresses?

- a. 0,430    b. 1,40    c. 2,500    d. 3,400    e. 4,112

5. Consider the following page reference string:

7, 2, 3, 1, 2, 5, 3, 4, 6, 7, 7, 1, 0, 5, 4, 6, 2, 3, 0, 1.

Assuming demand paging with three frames, how many page faults would occur for the following replacement algorithms?

- (a) LRU replacement    (b) FIFO replacement    (c) Optimal replacement

**Section B: Each question carries four marks**

6. What is the hardware support required to implement demand paging? Write down the steps involved in handling a page fault during the demand paging.
7. Consider a file system where a file can be deleted and its disk space Reclaimed while links to that file still exist. What problems may occur if a new file is created in the same storage area or with the same absolute path name? How can these problems be avoided?
8. Consider a paging system with the page table stored in memory.
  - a. If a memory reference takes 200 nanoseconds, how long does a paged memory reference take?
  - b. If we add TLBs, and 75 percent of all page-table references are found in the TLBs, what is the effective memory reference time? (Assume that finding a page-table entry in the TLBs takes zero time, if the entry is there.)

**Section C: Marks are shown in front of each question separately**

9. Suppose that a disk drive has 5,000 cylinders, numbered 0 to 4999. The drive is currently serving a request at cylinder 2150, and the previous request was at cylinder 1805. The queue of pending requests, in FIFO order, is:  
**[6 Marks]**

**2069, 1212, 2296, 2800, 544, 1618, 356, 1523, 4965, 3681**

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?

- a. FCFS
- b. SSTF
- c. SCAN
- d. LOOK
- e. C-SCAN
- f. C-LOOK

10. Suppose that the disk in problem above **Question No.9** rotates at 7200 RPM. **[2 Marks]**
  - a. What is the average rotational latency of this disk drive?
  - b. What seek distance can be covered in the time that you found for part a?

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