St. Thomas’ College of Engineering & Technology

**B.Tech. 6th Semester, 1st Assignment Examination, March 2018**

**Operating System [CS - 603]**

## Full Marks : 40 Time : 1½ Hour.

1. Consider a system with a 32 bit logical address space, a two-level paging scheme, 4 byte page table entries, 1 KB pages and a 4 entry TLB. The page-table base register access time is 0 ns, TLB access time is 10 ns and memory access time is 100 ns. 5

a. How many address bits are needed for the page offset?

b. How many memory in bytes is required to store the outer page table entry in main memory?

2. Consider the following segment table:

Segment Base Length

0 219 600

1 2300 14

2 90 100

3 1327 580

4 1952 96

What are the physical addresses for the following logical addresses? 5

a. 0, 430

b. 1, 10

c. 2, 500

d. 3, 400

e. 4, 112

3. Given five memory partitions of 100 KB, 500 KB, 200 KB, 300 KB, and 600 KB (ill order), how would 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? 5

4. Consider the following sequence of memory references generated by a single program in a pure paging system:

10, 11, 104, 104, 170, 173, 177, 309, 245, 246, 247, 458, 364

Determine the no. of page faults for each of the following page replacement policies assuming three (3) page frames are available and all are initially empty. The size of a page is 100 words: 10

i) LRU

ii) FIFO

iii) Optimal page replacement

5. Suppose that the disk drive has 5000 cylinders number 0 to 4999. The drive is currently serving a request at cylinder 143 and the previous request was at 125, the queue of the pending request in FIFO order is: 86, 1470, 913, 1174, 948, 1509, 1022, 1750, 130 starting from the current head position, **measure** total distance (cylinders) that the disk arm moves to satisfy all the pending requests for each of the disk scheduling algorithms.

i. SSTF

ii. SCAN

iii. LOOK

iv. C-LOOK 10

6. What is the data transfer rate in MB/s and average access time for a hard disk having capacity 100 MB? It has 18 storage surfaces with number of tracks per surface 600. Disk speed is 3000 rpm and average seek time is 25 ns. 5