EAST WEST UNIVERSITY BANGLADESH
Department of Computer Science & Engineering

CSE325: Operating System

Final-Term Examination **Summer 2015**

Total Marks: 40 Instructor: Dr. Md. Shamim Akhter Time: 120 minutes

PART-1 : Memory Management & Virtual Memory (20)

1. A system consists virtual/logical memory page size is 2K (2048 bytes), and main/physical memory of four (4) frames. Consider a process which requires 8 pages of storage. At some point during its execution, the process page table is as shown below:

Virtual page	Valid	Physical page
0	No	
1	No	
2	Yes	3
3	No	
4	Yes	1
5	No	
6	Yes	2
7	Yes	0

   a) List the logical address range (in bytes) for total virtual address space. (2)
   b) Give the main memory (physical) addresses for each of the following virtual addresses (all numbers in decimal bytes): (i) 8500, (ii) 2100. (3)

2.
   a) During **Compile and load time** address-binding methods generate identical logical & physical address. Why do they differ during **execution time**? Explain. (2)
   b) How does the paging scheme upgrade to demand paging scheme. Explain. (3)

3.
   a) Consider the following segment table:

Segment #	Base	Length
0	219	600
1	2300	14
2	90	100
3	1327	580
4	1952	96

Convert the following logical addresses (Segment#, Offset) to physical addresses. (3)
i. 0,430 ii. 2,500 iii. 5,411

b) What is page fault? Write the steps to handle page faults. (3)

c) In pure **on-demand paging**, a page replacement policy is used to manage system resources. Suppose that a newly-created process has **three (3) page frames** allocated to it, and then generates the page references indicated below (bolded A & B are written and modified):

A B C **B** A D A B C D **A** B C

How many page faults would occur with:

i. **LRU (stack)** page replacement? (2)
ii. **Second-chance cyclic** page replacement? (2)

PART-2 : File Management, I/O Management and Storage Devices (20)

4.

a) Use the given information to calculate the average disk access time for one sector, in milliseconds. The average seek time 7 ms, transfer rate 6 MB/sec rotation speed 5000 RPM, sector size 1024 bytes and controller overhead 2 ms. Assume the queue is idle (no service time). (3)

b) A disk request queue has requests for blocks on the following cylinders (ordered by time of arrival): **17, 50, 45, 68,87, 48, 89, 44, 92**
The disk has **100 cylinders** numbered 0 through 99. The disk head is currently at cylinder 46 and is moving towards cylinder 99. Calculate **the total seek distance** for each of the following algorithms: **FCFS, SSTF, SCAN, and C-LOOK**. (7)

5.

a) How does the processor communicate with a device controller? Is there any POOLING here? Write the name of the existing substitute techniques. (5)

b) Specify the contiguous allocation problems and their solutions for file management. (2)

c) Is the linked allocation method reliable? Write the advantages and disadvantages of index allocation method over linked allocation method. (3)