BENGAL ENGINEERING AND SCIENCE UNIVERSITY, SHIBPUR
M.E. 1ST SEMESTER (IT) FINAL EXAMINATIONS, 2011
Design of Operating System (ICE 904/4)

Full Marks: 70 **Time: 3 hrs**

Answer any five questions.

Q1. a) In *getblk* algorithm i) if the buffer is in hash queue and the buffer state is busy, then the process goes to sleep. Why? ii) If the buffer is marked for delayed write, then what action is taken by *getblk* algorithm? [3+3]
b) Write the *breada* (block read and read ahead) algorithm. [8]

Q2. a) Write two advantages and two disadvantages of using buffer cache. [6]
b) For an in-core inode a reference count is maintained, however for a buffer no such reference count is maintained, why? [3]
c) In the algorithm *iput*, under what condition the disk inode is updated? [2]
d) Describe the contents of a super block. [3]

Q3. a) State in brief the working principle of the algorithm *namei*. [6]
b) Describe how the entries of the User File Descriptor Table, File Table, and the Inode Table are modified during the execution of the *open* system call. [4]
c) Differentiate between capacity misses and conflict misses. [4]

Q4. a) Argue why SSTF disk scheduling algorithm tends to favor requests to midrange tracks at the expense of the requests to the innermost and outermost tracks. [4]
b) Show when two write requests can be served simultaneously in i) RAID level 1 ii) RAID level 5. [3+3]
c) What is FAT (File Allocation Table)? [4]

Q5. a) Describe how a CPU generated logical address is translated into a physical address is translated using the inverted page table. [4]
b) State and illustrate how a logical address is translated into physical address using the combined scheme of segmentation and paging. [6]
c) Describe the NUMA multiprocessor architecture. [4]

Q6. a) What is NORMA memory-access architecture? State two disadvantages of NORMA. [2+2]
b) What do you understand by CC-NUMA (Cache-Coherent NUMA)? [4]
c) What are i) dirty eager process migration ii) copy-on-reference process migration, and iii) precopy method of process migration? [3 x 2]