CS/EI/IT–502(O) & EI–502(N)

B. E. (Fifth Semester) EXAMINATION Dec., 2009

(Old & New Scheme)

(Common for CS, EI & IT Engg. Branch)

OPERATING SYSTEM

Time : Three Hours

Maximum Marks : 100

Minimum Pass Marks : 35

Note : Attempt any *one* question from each Unit. All questions carry equal marks.

Unit—I

1. (a) Explain the following terms :   10

    (i) Multiprogramming

    (ii) Spooling

    (iii) Direct memory access

    (iv) Racing

    (b) List and briefly define four classes of real time scheduling algorithms.   10

Or

2. (a) Discuss the properties of the following type of operating systems :   10

    (i) Interactive

(ii)   Network

(iii) Distributed

(b) Five batch jobs A through E, arrive at a computer centre at essentially the same time. They have an estimated running time of 15, 9, 3, 6 and 12 minutes respectively. Their priorities are 6, 3, 7, 9 and 4 respectively with lower value correponding to a higher priority. For each of the following scheduling algorithms determine the TAT for each process and the average turn around for all jobs :   10

(i)   Round robin with time quantum of i minute

(ii) FCFS

(iii) Priority scheduling

(iv) Shortest jobs first

Unit – II

3. (a) What operations can be performed on a semaphore ? What is the difference between binary and general semaphores ?   10

(b) The following expressions describe the serial/parallel precedence relationship among six processes p_1 through p_6 :

$$p \, (s \, (p_3, s \, (p_1, p \, (p_6, p_5)), p_2), p_4)$$

where p indicates parallel and s indicates serial. Transform the expression into program using :   10

(i)   Fork-Join construct

(ii) Cobegin-Coend statements

Or

4. (a) What are the basic requirements for the execution of concurrent processes ?   5

(b) List the requirements for mutual exclusion.   5

(c) Discuss Banker's algorithm. Explain deadlock prevention techniques.   10

Unit – III

5. (a) What is compaction ? How is it implemented ?   10

(b) Discuss in brief about the following :   10

   (i)   Relocation

   (ii) Protection

   (iii) Logical organization

   (iv) Physical organization

Or

6. (a) In fixed partitioning scheme what are the advantages of using unequal size partitions ?   5

(b) Differentiate between the following :   5

   (i)   Page and Frame

   (ii) Page and Segment

(c) Consider a fixed partitioning scheme with equal size partitions of 2^{16} bytes and a total main memory size of 2^{24} bytes. A process table is maintained that includes a pointer to partition for each resident process. How many bits are required for the pointer ?   10

Unit – IV

7. (a) What is the relationship between FIFO and clock page replacement algorithms ? Explain.   10

(b) Consider a paged virtual memory system with 32 bit virtual addresses and 1 kB pages. Each page table entry requires 32 bits. It is desired to limit the page table size to one page.

   (i)   How many levels of page tables are required ?

(ii) What is the size of the page table at each level ?

(iii) Which strategy consumes the least number of pages — smaller page size at the top or at the bottom level of the page table hierarchy ?   10

Or

8. (a) What is Thrashing ? How thrashing is detected by the system ? Explain.   10

(b) Describe the segmented paging scheme of memory management and the hardware required to support the system.   10

Unit — V

9. (a) Explain sector queuing.   10

(b) The disk queue in the request for I/O to block on cylinders are 98, 183, 37, 122, 14, 124, 65, 67. If the disk head is initially at 53, compute the total head movement for the following algorithms :   10

(i) FCFS

(ii) SSTF

(iii) SCAN

(iv) C-SCAN

Or

10. (a) Explain various file allocation methods in detail.   10

(b) Write detailed notes on any *two* of the following :   10

(i) Directory system

(ii) Interleaving

(iii) File protection