Total number of printed pages – 7   **B. Tech**
                                   BCSE 3305

Eighth Semester Examination – 2008

OPERATING SYSTEMS

Full Marks – 70

Time : 3 Hours

Answer Question No. **1** *which is compulsory*
and any **five** *from the rest.*
The figures in the right-hand margin
indicate marks.

1.   Answer the following questions :   2 ×10

   (a)   What is the hit ratio of a cache if a
         system performs memory access at 30 ns
         with cache and 150ns without it ? Assume
         cache access time is 20 ns.

   (b)   Define cache hit ratio.

   (c)   Specify two advantages of multiprogram-
         ming ?

   (d)   What is filter in UNIX ? Give a suitable
         example.

   (e)   Four jobs A, B, C, D arrive at a single
         processor system at the same time. The
         CPU burst time represents are 4, 1, 8, 1
         time units respectively. Find completion
         time of A in Round Robin scheduling with
         one unit of time slice.

   (f)   A computer has 6 tape drives. Among n
         programs. Each needs two tape drives.
         For a system to be deadlock free what is
         maximum value of n ?

(g) With segmentation, if there are 64 segments and maximum segment size 512 words. What will be the length of logical address ?

(h) Consider the reference string 1, 2, 3, 4, 5, 3, 4, 1, 6, 7, 8, 7, 8, 9, 7, 8, 9, 5, 4, 5, 4, 2. Find the number of page fault in LRU scheme.

(i) A counting semaphore has initialized to 10. Then six P and four V operations were completed on this semaphore, what is the resulting value of semaphore ?

(j) void main ()
```
{
    fork (); How many processes will be
        created ?
    fork ();
}
```

2. (a) Consider a memory system with following parameters,

Cache access time = 100 ns

Memory access time = 1200 ns

If we would like to have average memory access time to be no more than 20% higher than cache access time. What will be the lie ratio ? 5

(b) What is virtual memory ? Describe a scheme with block diagram that supports virtual memory. 5

3. (a) What is deadlock ? What are the necessary and sufficient conditions to occur deadlock in a system ? 3

(b) Differentiate between deadlock avoidance and prevention. Why it is not possible to prevent deadlock ? 3

(c) For the following data

	Allocation	Max
P_0	010	753
P_1	200	322
P_2	302	902
P_3	211	222
P_4	002	433

Check whether the system is safe ? If so find a safely sequence. 4

4. State Dining Philosopher's problem. Suggest a deadlock free algorithm to solve this problem.

10

5. (a) For the three processes P_1 P_2 P_3 with CPU burst time of 30 ms, 6 ms, and 8 ms respectively, find the average TAT, average waiting time and average response time with time quantum 5 ms. Assume all the jobs are available at the same time. 6

(b) Discuss the Multilevel feedback scheduling. State its advantages. 4

6. (a) What is a critical section problem ? Illustrate with a real time example. 4

(b) Why P and V operations of a semaphore need to be atomic ? 2

(c) Define semaphore. Write the P and V operations on semaphore. 4

7. (a) Distinguish between protection and security in a computer system. 2.5

(b) How does OS support protection and security ? 2.5

(c) Differentiate between capability list and access control list ? 2.5

(d) What is an I-Mode ? State the I-node mapping in Unix. 2.5

8. Write notes on : 2.5×4

   (a) Process State transition diagram

   (b) Lamport's Backery Algorithm

   (c) RAID

   (d) Thrashing.

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