[Total No. of Questions - 9] [Total No. of Printed Pages - 3]
(2067)

17066(M)

B. Tech 4th Semester Examination

Operating System (CBS)

CS-402

Time : 3 Hours **Max. Marks : 60**

The candidates shall limit their answers precisely within the answer-book (40 pages) issued to them and no supplementary/continuation sheet will be issued.

Note : Attempt five questions in all selecting one question each from section A, B, C, and D. Section E is compulsory. Use of non-programmable calculators is allowed. Substantiate your answers with suitable examples wherever required.

SECTION - A

1. (a) What are the various components of operating system? (6)

   (b) Compare multiprogramming and multiprocessing. What are the advantages offered by these concepts in computing? (6)

2. (a) Describe the significance of virtual machine. Explain how security aspects are handled in virtual machine. (6)

   (b) Describe distinct aspects that distinguish a microkernel architecture for an operating system from a monolithic architecture? (6)

SECTION - B

3. (a) What is thread? List the 3 most important attributes that an operating system maintains to keep track of information about a thread. (6)

(b) Using non-preemptive scheduling and taking all decisions on the information available at the time when the decision must be made answer the following questions for the following three process arriving at the time indicated.

Processes	Arrival Time (sec)	Running time (sec)
P1	0.0	16
P2	0.3	5
P3	1.0	3

(i) What is the average turnaround time for these processes under the FCFS (first-come, first-served) scheduling algorithm?

(ii) What is the average turnaround time for these processes under the STCF (Shortest Time to Completion First) scheduling algorithm?

(iii) The STCF algorithm is supposed to improve performance. However, we chose to run process P1 at time 0.0 second because we did not know that shorter-running processes would arrive soon. Compute what the average turnaround time would be if the CPU were left idle for the first 1 second and then STCF were used. (6)

4. (a) Explain how processes on the same processor can communicate with one another. Also highlight if the hardware support for the same would be required. (6)

   (b) Explain what is meant by starvation in the context of a solution to the mutual exclusion problem. (6)

[P.T.O.]

SECTION - C

5 (a) Differentiate between SCAN and C-SCAN disk scheduling algorithms. (6)

(b) Explain different allocation techniques. Elaborate advantage of contiguous allocation & over linked allocation? (6)

6 (a) Compare internal fragmentation and external fragmentation with the help of suitable examples. (6)

(b) Consider a memory system with a cache access time of 10ns and a memory access time of 200ns. If the effective access time is 10% greater than the cache access time, what is the hit ratio H? (6)

SECTION - D

7. (a) What is deadlock? Name the four conditions required for deadlock and give a brief description of each. (6)

(b) What is the difference between deadlock prevention and deadlock avoidance? What category does Bankers algorithm falls in and why? (6)

8. (a) Describe the server design issues. (6)

(b) Explain how UNIX has a better policy to handle smaller files than the larger files? Explain how UNIX is booted. (6)

SECTION - E

9. Write Short notes on:

(a) Timesharing system.

(b) Process graphs.

(c) Directory Structure.

(d) Security Attacks. (3×4=12)