

[Time: 2½ Hours]

[Marks: 75]

Please check whether you have got the right question paper.

- N.B:
1. **All** questions are **compulsory**.
 2. **Make suitable assumptions** wherever necessary and **state the assumptions** made.
 3. Answers to the **same question** must be **written together**.
 4. Numbers to the **right** indicate **marks**.
 5. Draw **neat labeled diagrams** wherever **necessary**.
 6. Use of **Non-programmable** calculators is **allowed**.

1. Attempt any three of the following:

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- a. Write a note on Microkernel Systems.
- b. Explain Virtual memory architecture of operating system. Draw necessary diagram.
- c. Explain The Dining Philosophers Problem.
- d. How to implement Threads in the Kernel space and Threads in the User space?
- e. Explain the Barriers synchronization method.
- f. Consider the following set of processes, with the arrival times and the CPU burst times given in milliseconds.

Process	Burst Time	Arrival Time
P1	15	0
P2	5	0
P3	13	0

Draw Gantt chart, calculate Turnaround Time, Waiting Time, Average Turnaround Time and Average Waiting Time for:

- i.) First-Come First-Served.
- ii.) Shortest Job First.

2. Attempt any three of the following:

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- a. What are design issues with paging system?
- b. Explain in brief concept of segmentation.
- c. Explain WSClock Page Replacement Algorithm with an example.
- d. List and explain any five file operations.
- e. Explain UNIX V7 file system.
- f. Write a note on I-nodes and Linked list allocation.

3. Attempt any three of the following:

- a. What are the goals of the I/O Software?
- b. Define deadlock. Give example for the same.
- c. What is interrupt? Explain its types.
- d. Write a note on power management.
- e. Explain Starvation.
- f. Describe Livelock.

[TURN OVER]

4. Attempt any three of the following:
 - a. Give advantages of Cloud Computing.
 - b. How to migrate a virtual machine more quickly?
 - c. Explain 2*2 Multistage Switching Network.
 - d. State and explain the Type 1 and Type 2 Hypervisors.
 - e. Explain Master-Slave Multiprocessors.
 - f. Write a note on Document-Based Middleware.

 5. Attempt any three of the following:
 - a. Describe Linux kernel with appropriate diagram.
 - b. Write a short note on Synchronization in Linux.
 - c. Explain any five memory management system calls in Windows.
 - d. Write a note on caching in Windows.
 - e. Explain process lifecycle in Android.
 - f. How Android supports security?
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