Note: Give a brief and correct answer. **Mention your name and roll number on the answer sheet. Answer the question after writing the question in the answer sheet.**

1. Is it possible to build an operating system without employing the notion of "caching". Discuss.

2. Elaborate the issue of "cache coherency".

3. Like any system, the operating system has Input and Output. Based on the topics you have studied, what constitutes as Input and Output of an operating system?

4. How spooling has improved the CPU utilization?

5. Operating system is called as a "Interrupt Controller". Justify.

Note: Give a brief and correct answer. **Mention your name and roll number on the answer sheet. Answer the question after writing the question in the answer sheet.**

1. What do you understand by the term "long term scheduler"?
2. What are the strengths and weaknesses of the two models of inter-process communication?
3. Consider a multiprocessor system and a multi threaded program using many-to-many threading model. Let the number of user-level threads in the program be more than the number of processors in the system. Discuss the performance implications of the following: "The number of kernel threads allocated to the program is less than the number of processors".
4. Do you agree that "multithreading framework improves both Concurrency and Parallelism on multicore system?" Justify your answer.
5. Suppose a CPU scheduling algorithm favors those programs that have used little processor time in the recent past. Explain why this algorithm favors I/O-bound processes and yet does not permanently deny processor time to CPU-bound processes ?
6. What is the purpose of thread pools?

Note: Give a brief and correct answer. **Mention your name and roll number on the answer sheet. Answer the question after writing the the FIRST 10 WORDS OF THE QUESTION ALONG WITH THE QUESTON NUMBER in the answer sheet.**

1. Discuss how the notions of hierarchy and information hiding are helpful in easing the development of operating system?

2. There are five levels in THE operating system.. Discuss the advantages of hierarchical organization considering the sample functions or operations of level 0 and level 1. What would have happened, if the services of level 0 and level 1 would have been written in a single level ?

3. What motivated Dijkstra to introduce semaphores?

4. Explain the context of "probe instructions" in Dijkstra's paper entitled "My recollections of OS design". List the problems caused   by probe instructions.

5. Discuss the difference between block I/O system and character I/O system in UNIX.

6. Consider the following levels in a hypothetical OS. Take any two operations and discuss the corresponding differences at each level.

LEVEL	NAME	OBJECTS	OPERATIONS
Level 11	Devices (access to external devices)	Printers, displays, and key boards	Create, destroy, open, close, read, write
Level 10	File system	Files	Create, destroy, open, close, read, write

Quiz 3

Operating Systems and Networks

IIIT Hyderabad

Time: 30 minutes; Max. Marks: 24

Note: Give a brief and correct answer. **Mention your name and roll number on the answer sheet. Answer the question after writing the FIRST 10 WORDS OF THE QUESTION ALONG WITH THE QUESTON NUMBER in the answer sheet.**

1. In the UNIX system, directory is also treated as a file and there is a minimal difference between file and directory. What is the advantage of keeping minimal difference.
2. Describe the scheduling algorithm followed in UNIX.
3. What are the advantages and the problems of deferred block I/O system in UNIX.
4. Consider the following levels in a hypothetical OS. Take any two operations and discuss the corresponding differences at each level.

LEVEL	NAME	OBJECTS	OPERATIONS
Level 11	Devices (access to external devices)	Printers, displays, and key boards	Create, destroy, open, close, read, write
Level 10	File system	Files	Create, destroy, open, close, read, write

5. There are five levels in THE operating system.. Discuss the advantages of hierarchical organization considering the sample functions or operations of level 0 and level 1. What would have happened, if the services of level 0 and level 1 would have been written in a single level ?

6. Discuss basic problem faced by Dijkstra when he started designing the operating system. Explain how he has employed "probe instructions" and "interrupts" in OS design.

Quiz 4
Operating Systems and Networks
IIIT Hyderabad
Time: 30 minutes; Max. Marks: 24

Note: Give a brief and correct answer. **Mention your name and roll number on the answer sheet. Answer the question after writing the FIRST 10 WORDS OF THE QUESTION ALONG WITH THE QUESTON NUMBER in the answer sheet.**

1. Explain how FCFS CPU scheduler penalizes I/O bound processes. [4]

2. Consider a variation of round robin we will call progressive round robin. In progressive round-robin, each process has its own time quantum. This starts out at 50ms, and increases by 50 ms each time it goes through the round-robin queue. Give the advantages and disadvantages of this variant over ordinary-round robin with respect to the users of batch jobs and interactive jobs.[10]

3. Explain the application of priority inheritance protocol?[6]

4. Identify whether the following statement is TRUE or FALSE. If the statement is FALSE, correct it and justify the corrected sentence. If the statement is TRUE, justify it. Restrict the justification to a few   sentences. "As compared to CPU-bound process, OS gives higher priority for I/O bound process." [4]

Quiz 5
Operating Systems and Networks
IIIT Hyderabad
Time: 30 minutes; Max. Marks: 24

Note: Give a brief and correct answer. **Mention your name and roll number on the answer sheet. Answer the question after writing the FIRST 10 WORDS OF THE QUESTION ALONG WITH THE QUESTON NUMBER in the answer sheet.**

1. An old bridge on a busy highway is too narrow to permit two-way traffic, so one-way traffic is to be implemented on the bridge by alternatively permitting vehicles travelling in opposite direction to use the bridge. The following rules are formulated for use of bridge:

    (a)   Any time the bridge is used by vehicle(s) travelling in one direction only.

    (b)   If the vehicles are waiting to cross the bridge at both ends, only one vehicle from one end is allowed to cross the bridge before a vehicle from the other end starts crossing the bridge.

    (c)   If no vehicles are waiting at one end, then any number of vehicles from the other end are permitted to cross the bridge.

  Develop a program (Pseudocode) to synchronize vehicles with semaphores. [12]

2. Compare the deadlock prevention algorithms by preventing circular-wait with the deadlock avoidance algorithm (i.e., the banker's algorithm) with respect to the following: runtime overheads and system throughput [5]

3. Identify whether the following statement is TRUE or FALSE. If the statement is FALSE, correct it and justify the corrected sentence. If the statement is TRUE, justify it. Restrict the justification to a few sentences: "Deadlock prevention protocols improve CPU utilization" [5]

Note: Give a brief and correct answer. **Mention your name and roll number on the answer sheet.**
Answer the question after writing the FIRST 10 WORDS OF THE QUESTION ALONG
WITH THE QUESTON NUMBER in the answer sheet.

1. Developments in operating systems have generally occurred in an evolutionary rather than revolutionary fashion. For the following transition, describe the primary motivations of operating systems designers that led them to produce the new type of system from the old: **Contiguous storage allocation systems to non-contiguous storage allocation systems. [6]**

2. Explain the problems if you swap a process with pending I/Os. [6]

3. Given memory partitions (holes) of 100K, 500K, 200K, 300K and 600 K (in order), how would each of the First-fit, Best-fit, and Worst-fit algorithms place processes of 212K, 417K,112K and 426K (in order) ? Which algorithm makes efficient use of memory ? [6]

4. Assume a page size of 4Kbytes and that a page table entry takes 4 bytes, how many levels of page tables would be required to map a 64-bit address space, if the top level page fits into a single page ? [6]

Note: Give a brief and correct answer. **Mention your name and roll number on the answer sheet.**
Answer the question after writing the FIRST 10 WORDS OF THE QUESTION ALONG WITH THE
QUESTON NUMBER in the answer sheet.

1. Briefly explain the importance of "quality of service" and "admission control". [3]

2. Identify whether the following statements are TRUE or FALSE. If the statement is FALSE, correct it
    and justify the corrected sentence. If the statement is TRUE, justify it. Restrict the justification to few
    (less than five) sentences. "In UNIX, system administrator (root) can know the passwords of users".
    [3]

3. Briefly explain the following consistency semantics with positive and negative points. (i) UNIX
    semantics (ii) session semantics. [6]

4. How RAID 4 is better than RAID 3?   Also, compare RAID 4 and RAID 5 [6]

5. Define the word "quality of service". Discuss what techniques could be used to meet quality-of-
    service requirements for multimedia applications for the following components of a system: (a)
    Process scheduler (b) Disk scheduler (c) Memory manager [6]

Quiz 8
Operating Systems and Networks
IIIT Hyderabad
Time: 30 minutes; Max. Marks: 24

Note: Give a brief and correct answer. **Mention your name and roll number on the answer sheet.**
Answer the question after writing the FIRST 10 WORDS OF THE QUESTION ALONG
WITH THE QUESTON NUMBER in the answer sheet.

1. What is the difference between distributed system and computer network?[2]

2. What is the purpose of communication satellites? [2]

3. How Fourier analysis will help to reduce the bandwidth? [5]

4. What is the purpose of multiplexing? What will happen if you do not use multiplexing?[5]

5. Explain how the notion of piggybacking is employed by datalike layer? What is the issue with piggybacking?[5]

6. Why Nonpersistent CSMA Protocol gives better performance over 1-Persistent CSMA Protocol? Discuss.[5]

Quiz 9
Operating Systems and Networks
IIIT Hyderabad
Time: 30 minutes; Max. Marks: 24

Note: Give a brief and correct answer. **Mention your name and roll number on the answer sheet. Answer the question after writing the FIRST 10 WORDS OF THE QUESTION ALONG WITH THE QUESTON NUMBER in the answer sheet.**

1. Explain why FIFO packet scheduling algorithm fails to provide good service for diverse applications? [6]

2. Explain the purpose of leaky bucket algorithm? What will happen, if you do not implement leaky bucket algorithm? [6]

3. What are the issues of implementing "Connection Establishment" in the transport protocol? Explain the justification of employing three-way hand shake.[6]

4. Explain the issue of regulating the sending rates to obtain desirable bandwidth controlling the congestion?   Additive Increase Multiplicative Decrease (AIMD)? [6]